# PrintList Pro

# User Manual

## Version 4.7.1

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# About PrintList Pro

PrintList Pro is an easy-to-use tool for printing arrays and records on 4th Dimension layouts. It lets you print arrays or fields.

PrintList Pro is the perfect complete to AreaList Pro, providing a full-featured plug-in which can be used to print columns of data. You can use PrintList Pro for any standard columnar output (arrays or fields) and it be configured to easily print a PrintList Pro object, retaining all formatting features.

Because PrintList Pro is a plug-in, it is very fast, and provides capabilities not available to you using native 4D arrays or report printing tools, such as automatic column sizing, custom formatting, robust break level processing, and more.

Data is passed to PrintList Pro using 4D arrays, or field numbers. If only two columns need to be printed, create two arrays or specify two fields and pass them as parameters to PrintList Pro. No string parsing or other contortions are needed.

PrintList Pro can be used with just one command — no special formatting is required. For those cases when more control is needed, several optional commands give you complete control over the appearance of the area.

Special tools are implemented if you wish to customize the appearance and configuration of PrintList Pro, allowing the customization to be implemented rapidly.

PrintList Pro's break level processing includes the ability to apply a variety of built-in calculations as well as the ability to perform custom calculations. Complete control over style, color, and formatting of all break level information is given.

## Compatibility Information

PrintList Pro is fully compatible with 4D/4D Server 2004 or greater (including 4D v11 SQL). It is compatible with MacOS and Windows clients.

PrintList Pro provides the perfect companion to 4D v11 SQL new SQL language and direct array filling. Using a simple generic form for all your SQL queries, you can easily output the SQL result set to any print location (including 4Ds built-in PDF output capabilities).

## Technical Support

Technical support for PrintList Pro will be provided electronically via e-mail or our online support reporting system. You are encouraged to use the online web reporting form as it will be correctly routed to the appropriate support personnel.

www.e-node.net

# Registration

PrintList Pro requires a registration key to "unlock" the product making it a full working version. Call the ***PL_Register*** command (see PL_Register for complete details) in the *On Startup* method.

Without the registration key, PrintList Pro will operate in demonstration mode during 20 minutes.

Version 4.7 introduced a new license design. Previous licenses will not work with this release.

In order to activate PrintList Pro 4.7 and above, you need to require a new license key from e-Node.

Upgrades from version 4.6 to version 4.7 are provided for free to all registered users (proof of purchase will be required if the previous license was not purchased from e-Node).

# License types

Like all e-Node plug-ins, PrintList Pro offers six different license types. There are no such things as MacOS vs Windows or Development vs Deployment:

- **Single user license**. This license allows development (interpreted mode) or deployment (interpreted or compiled mode) on 4D Standalone or Runtime. Since the registration key is linked to a specific 4D license, you need to provide the number returned by the 4D command **GET SERIAL INFORMATION** (first parameter). A new license will be supplied for free at any time if you change your 4D version and/or get a new 4D registration key, provided that your previous licenses match the current public version at the exchange time.
- **Small server**. This license allows development (interpreted mode) or deployment (interpreted or compiled mode) on 4D Server up to 10 users. The registration key is linked to your 4D Server license just as above.
- **Medium server**. This license allows development (interpreted mode) or deployment (interpreted or compiled mode) on 4D Server up with 11 to 20 users. The registration key is linked to your 4D Server license just as above.
- **Large server**. This license allows development (interpreted mode) or deployment (interpreted or compiled mode) on 4D Server over 20 users. The registration key is linked to your 4D Server license just as above.
- **Unlimited Single User**. This license allows development (interpreted mode) or deployment (interpreted or compiled mode) on as many 4D Standalone, Runtime or Engine copies that run your 4D application(s). This is a yearly license, which expires after the date when it is to be renewed. The expiration only affects interpreted mode. **Compiled applications using an obsolete license will never expire**.
- **Unlimited OEM**. This license allows development (interpreted mode) or deployment (interpreted or compiled mode) on as many 4D Server (of any umber of users), 4D Standalone, Runtime or Engine copies that run your 4D application(s). This is a yearly license, which expires after the date when it is to be renewed. The expiration only affects interpreted mode. **Compiled applications using an obsolete license will never expire**.

A 4D database used to retrieve your 4D serial information is available from the following link:

http://www.e-node.net/ftp/GetSerialInfo

# Using the PrintList Pro Manual

An overview of the PrintList Pro commands and usage is covered in Developing with PrintList Pro.

Commands are organized by topic into individual chapters. Each chapter begins with an overview of the topic, and how to use the different commands. Each command is then covered in detail, and examples provided.

***Commands and parameters that are new in PrintList Pro version 4.6 are displayed in green characters.***

***Items that are new or modified in PrintList Pro version 4.7 are displayed in pink (magenta) characters.***

If you are unable to resolve a problem using this manual, you can contact our Technical Support Department. See Technical Support.

# Cross-Referencing Format

Each time a command or section is mentioned, a cross-reference is given through hyperlinks to let you quickly find the definition for the command.

# Command List

The alphabetical list includes the parameters for each command and the page number/link to the command definition.

# Constant List

A full list of PrintList Pro constants is also available, organized by theme with each constant's actual value.

## Command Descriptions and Syntax

Each PrintList Pro command (or routine) has a syntax, or rules, that describe how to use the command in your 4D database. For each command, the name of the command is followed by the command's parameters. The parameters are enclosed in parenthesis, and separated by semicolons.

Following the command syntax description, an explanation of the command's parameters is provided. For each parameter, the type of the parameter and a description is shown. Examples are provided, showing the syntax as well as how the various commands are used together.

The first parameter for most commands is the long integer reference of the PrintList Pro object on the layout. This parameter is required to allow the commands to operate on the correct object.

Some routines are actually functions, which return a long integer result value. Unless otherwise indicated, the value is 0 when no error occurred, or -50 (paramErr) when a wrong parameter has been received.

In some instances (unlikely with the recent hardware and OS versions), PrintList Pro routines can also return memory manager errors.

# Installing PrintList Pro

This chapter outlines the steps necessary for installing PrintList Pro into your existing applications.

PrintList Pro must be installed (and de-installed) using the bundle installation method described herein.

## Installation: Plug-In bundle (MacOS & Windows)

PrintList Pro is provided as a plug-in bundle for 4D 2004, 4D v11 SQL or higher.

This single version will work with MacOS and Windows deployments (you don't need separate MacOS and Windows versions).

**1** — Locate the folder where PrintList Pro has been installed on your computer.

**2** — Locate the 4th Dimension structure where you wish to install the PrintList Pro plug-in.

**3** — If you don't already have a directory labeled "Plugins", create one now.

**4** — Copy the following plug-in to your applications Plugins folder: plp.bundle.

# Configuring PrintList Pro

PrintList Pro is comprised of a suite of plug-in routines and 4th Dimension methods, designed to extend the existing 4th Dimension command set, providing a variety of miscellaneous utility routines.

PrintList Pro Plug-In routines are routines that exist in the PrintList Pro plug-in and do not require an addition installation or configuration actions outside of standard plug-in installation.

Just make sure you have successfully registered your copy of PrintList Pro by calling the plug-in's registration routines (please see PL_Register for more information).

```
$ret:=PL_Register("registrationKey")
```

# Creating a PrintList Pro Object on a Form

Implementing PrintList Pro in your 4D databases is very easy; in fact, printing data in a PrintList Pro area can be accomplished with only one plug-in command. The PrintList Pro object is drawn on a 4D layout using the plug-in area tool.

PLUG-IN AREA TOOL

4D opens the Property List for the object, which is where the object is named and configured. The name (variable) will be used as the areaRef parameter for the PrintList Pro commands.

Be careful to never have two PrintList Pro objects with the same name on a 4D layout.

# To Configure a Variable Object as a PrintList Pro Object

**1** — Create a variable object on a layout and display the variable Property List.

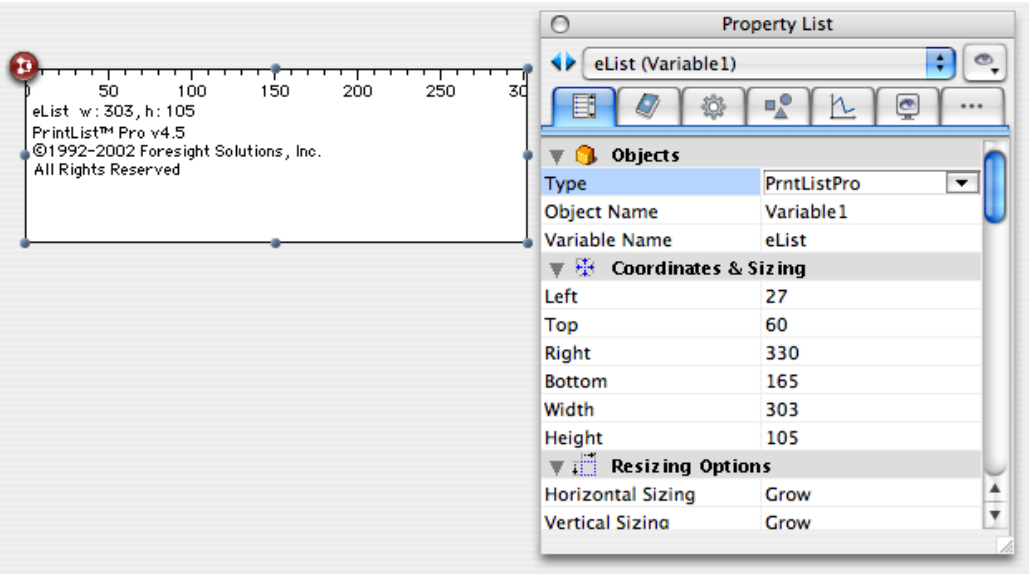
**2** — Select the PrintListPro object type.

**3** — Name the variable. This name will be used as the first parameter to many of the PrintList Pro commands. Note: this variable must be a process variable, not an interprocess variable (i.e. the name cannot begin with "<>" or "◊").

**4** — The PrintList Pro object is drawn in the Layout Editor.

The first line of text contains the name of the object and its pixel dimensions, and the remaining lines are the copyright notice.

The display of the object name, pixel dimensions and copyright notice is an indication that the object has been properly created and named.



# PrintList Pro Object Dimensions

PrintList Pro provides information to allow you to properly size the PrintList Pro area and to align it with other objects on the layout in the 4th Dimension Design environment.

A scale at the top of the plug-in area indicates the pixel width of the PrintList Pro object. This may be used to align other layout objects which appear adjacent to the PrintList Pro object.

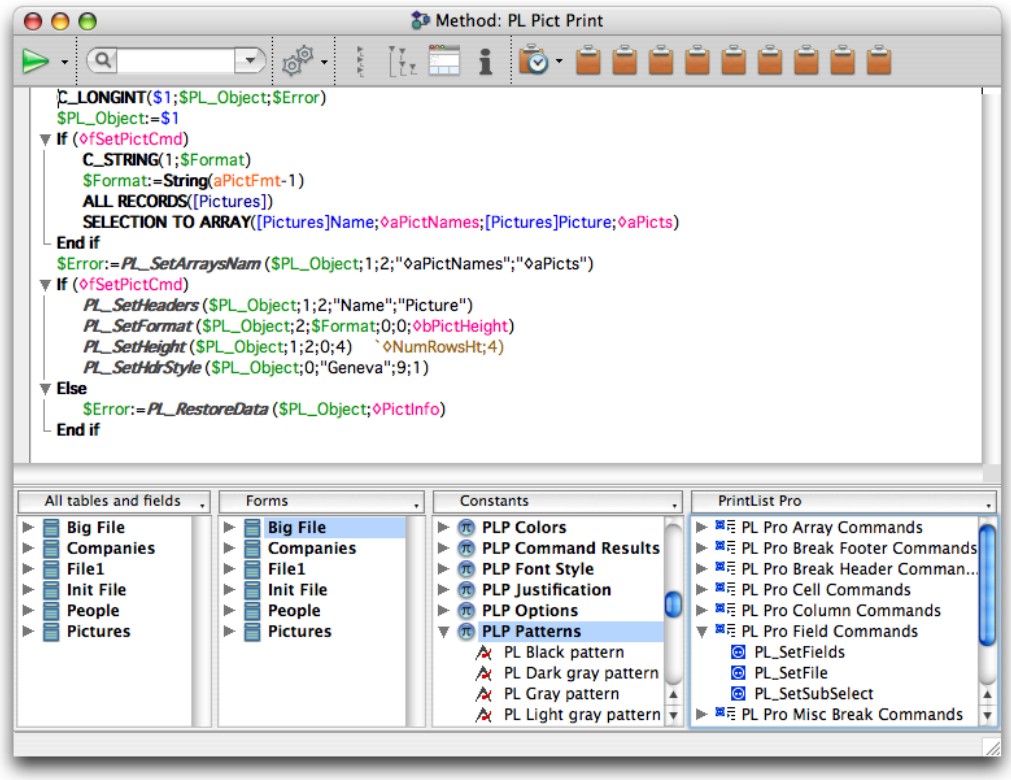
Displayed next to the object's name is the width and the height of the object as it is drawn on the layout. These values include the entire area printed by PrintList Pro, including the header, and they will be updated whenever the object is resized.

# Developing with PrintList Pro

PrintList Pro provides the ability to print up to 512 columns.

## Using the PrintList Pro Commands

The PrintList Pro Commands are used in the same way that a 4D command is used. Parameters are separated by the semicolon character (";"). You can access the PrintList Pro commands in the method editor list. Near the bottom of the list, below the area which contains the project methods, there are several PrintList Pro constant and command topics as shown below.




Simply select a constant or command, and 4D will enter it for you at the current cursor position.

You can also type the constant or command name directly into the method, or use the Explorer's Component page.

PrintList Pro commands are used to initialize the PrintList Pro object in the On Printing Detail phase of the 4D layout about to be printed. Typically, initialization code will be contained in the PrintList Pro area object method.

# When to use the PrintList Pro Commands

The PrintList Pro commands must only be executed in the On Printing Detail phase of a form method or object method during the execution of the **PRINT SELECTION** or **PRINT RECORD** command.

The **PRINT SELECTION** command will execute a On Printing Detail phase for each record in the current selection (and requires at least one record in the current selection to be executed at all). PrintList Pro will print the array(s) in any PrintList Pro object once for every record in the current selection.

***If you wish to use* PRINT SELECTION *to print an array only once, ensure that there is only one record in the current selection of the table used for printing (the one that holds the layout, which doesn't have to be related to the data that is actually printed).***

***If you wish to use* PRINT RECORD*, ensure that there a current record in the table used for printing (the one that holds the layout, which doesn't have to be related to the data that is actually printed).***

# Developer Alert

If the first parameter passed to any PrintList Pro command is not the object reference, an alert box will appear, informing you of the syntax error.

If this object reference is an AreaList Pro area or another plug-in area, PrintList Pro will also pass this information to you.

# Configuration Commands

A PrintList Pro object is initialized in the On Printing Detail phase as the record is about to be printed.

This initialization will be contained in the PrintList Pro plug-in area object method or in the form method.

## Using Defined Constants with PrintList Pro

There are defined constants that may be used as values for many parameters in the PrintList Pro commands. See the Constants tab of the Explorer in the 4D Design environment.

These constants are categorized according to the type of command that they are associated with, such as PLP Break Levels, PLP Colors, etc.

# Specifying the Arrays to Print

4D arrays are passed to PrintList Pro via the PL_SetArraysNam command. ***PL_SetArraysNam*** must be called before any other PrintList Pro commands are executed.

This is necessary to provide PrintList Pro with an opportunity to allocate the data structures necessary to store formatting information for each column. These data structures are allocated on a per column basis, and ***PL_SetArraysNam*** for a given column must be executed before any property of that column can be specified.

If the ***PL_SetArraysNam*** command is incorrectly used, an error code indicating the problem will be returned:

| Constant | Value | Action |
|---|---|---|
| PL SetArrays Passed | 0 | |
| PL Not an array | 1 | Check to make sure all arrays are correctly typed |
| PL Wrong type of array | 2 | Pointer and two-dimensional arrays are not allowed |
| PL Wrong number of rows | 3 | Make sure that all arrays have the same number of elements |
| PL Maximum number of arrays exc | 4 | 512 arrays is the maximum |
| PL Not enough memory | 5 | Increase 4D's RAM partition, or change your approach to use fewer or smaller arrays |

ARRAY SETUP ERROR CODES

Up to 512 arrays can be printed by PrintList Pro, with up to fifteen columns specified in each call to ***PL_SetArraysNam***.

The position of the first array, columnNumber, and the number of arrays, numArrays, are also specified in these commands. All array types except for pointer and two dimensional arrays, are allowed, and all arrays must have the same number of elements.

***The maximum number of rows is 2,000,000,000.***

In addition to standard single-dimension arrays, one dimension of a two-dimensional array may be passed to ***PL_SetArraysNam***. For example: "My2DArray{1}" may be passed as array1.

# Printing Records

PrintList Pro provides the capability to print 4D records directly, rather than using arrays. Please read the section Field and Record Commands for more information.

# Headers

The column header labels are set using PL_SetHeaders. The headers can be printed on all pages, the first page or not at all using PL_SetHdrOpts.

The font, size, and style of each header may be set individually using PL_SetHdrStyle. The justification may be set using PL_SetFormat and the color of the headers using PL_SetForeClr. Multiple lines of text may be shown in the headers using PL_SetHeight.

# Sorting Arrays

PrintList Pro can perform multi-level sorting upon all the arrays using PL_SetSort. Up to 15 levels of sorting are available, and each column specified in the sort order can be sorted in either ascending or descending order. While 15 columns can be used for the sorting critera, all the arrays passed to PrintList will stay “in sync” and reflect the new sort order.

Some of the arrays can be hidden from printing using PL_SetColOpts, which allows all the arrays to be kept in sync for sorting purposes, yet hides them during actual printing.

If the arrays passed to PrintList Pro are already sorted, use PL_SetBrkOrder to communicate the sort order to PrintList Pro without performing another sort. Also, repeated values in a list can be suppressed using PL_SetRepeatVal. Please read the section Break Level Processing for more information.

If a column containing a picture array is passed to ***PL_SetSort***, it and all subsequent arrays will be ignored.

# Formatting

Use PL_SetFormat to control the format and justification of all array information. All valid 4D formats may be used including any custom formats created in the Design Environment. See Break Level Processing for information about formatting break headers and break footers.

# Styles

## Column and Header Styles

Styles for arrays can be set on a column by column basis using PL_SetStyle to set the style for the data, and PL_SetHdrStyle to set the header style. If a 0 (zero) is used in the columnNumber parameter, the style will be applied to all columns.

## Row-Specific Styles

PL_SetRowStyle is used to set the font and style of a specified row, and will override any column specification.

## Cell-Specific Styles

Individual array elements, called cells, can be assigned a unique font, size and style. This capability can be used to provide special formatting to design more attractive and useful reports.

You can use PL_SetCellStyle to set the font, size and style configuration for an individual cell, a range of cells, or a selection of discontiguous cells. You can choose to set all or just one of the style attributes of this command.

PrintList Pro will keep the cell and row-specific style settings with a row when the list is sorted. If you do not want the cell and row style settings to move when the list is sorted, you should use the cell and row style routines after the call to PL_SetSort.

# Color

When using color or grayscale printers, many PrintList objects can be given color settings. Be sure to set the printer Color/Grayscale option to obtain the proper results.

## Column and Header Colors

Foreground and background colors can be specified for a PrintList Pro object using PL_SetForeClr and PL_SetBackClr. The foreground color can be specified for each column and column header, and the background color can be specified for the list and header areas.

In addition, PL_SetForeRGBColor and PL_SetBackRGBColor can be used to perform similar settings with standard RGB component values.

## Row-Specific Colors

PL_SetRowColor is used to set the foreground and background color of a specified row, and will override any column specification. You can revert to the original column settings by setting the plpRowForeColor or plpRowBackColor parameter to the empty string (""), and the 4dRowForeColor or 4dRowBackColor parameter to -1. Use this command to override all row-specific color settings by passing 0 for the rowNumber parameter.

## Cell-Specific Colors

Individual array elements, called cells, can be assigned a unique foreground color and background color. This capability can be used to set negative numbers in red, provide special formatting to show the current selected or enterable cell, and design more attractive and useful lists.

You can use PL_SetCellColor or PL_SetCellRGBColor to set the color configuration for an individual cell, a range of cells, or a selection of discontiguous cells.

PrintList Pro will keep the cell and row-specific color setting with a row when the list is sorted. If you do not want the cell and row color settings to move when the list is sorted, be sure to call the cell and row color routines after the call to PL_SetSort.

# Multiple Lines in each Row

Multiple lines of text can be shown for each row using PL_SetHeight. All rows will be printed with the number of lines specified, or with a variable height for each row. ***PL_SetHeight*** can also be used to give each row additional space above and below the row's contents to give more spread out rows vertically.

# Variable Height Rows

All rows can be printed with a varying height depending on the data that is to be printed. For rows, PrintList Pro will examine each row's text, string, and picture element using the applied font and style settings to determine the tallest cell of each row.

Any given row can be of no height (i.e. no data) up to the height of an entire page. For any row that is larger than a page, PrintList Pro will attempt to show as much of it as possible by starting the row at the top of the page. The row will be truncated to a page — no one row can span two pages.

To set all rows to be variable height, use PL_SetHeight and set the numRowLines parameter to zero.

Setting an individual row or cell font size may cause PrintList Pro to override a fixed height row setting and print the row using a larger height. In order to accommodate the larger font, PrintList Pro uses the variable height calculation to determine the height of the row based upon the font size setting.

# Column Widths

Columns are automatically sized by default; however, a column size can be programmed using PL_SetWidths. All widths are given in pixels. For development purposes, the actual column widths can be printed in the headers using PL_SetHdrOpts.

Column widths can be set manually using ***PL_SetWidths***; however, you may desire to use the widths generated by PrintList Pro's automatic column sizing as a good starting reference. The printPixelWidth parameter of ***PL_SetHdrOpts*** will print the width of each column in pixels.

Be sure to enable the printing of headers using the printHeaders parameter in the same command.

# Dividing Lines, Frame and Header Separator Lines

Dividing lines can be added between rows and columns using PL_SetDividers or PL_SetRGBDividers. The line width, pattern, and color of the lines can be specified. The default is no dividing lines.

The PrintList Pro frame and header separator (the line between the headers and the list or detail area) lines can be set using PL_SetFrame.

## Hairline Line Width

When using PostScript printers, lines can be printed a fraction of the line width seen on screen (1 pixel). Typically, ¼ (.25) pixel produces the best results. All the lines that PrintList Pro prints may be given a fractional line width.

When printing hairlines, patterns can produce unpredictable results due to their resolution. Using colors rather than patterns will often produce better results. You (or the database end-user) must be sure to set the Color/Grayscale option in the print dialog when using colors.

# Using Picture Arrays

PrintList Pro supports the printing of picture arrays. The format parameter of PL_SetFormat will cause the picture to be printed in one of four ways:

- truncated and justified to the upper left of the cell
- truncated and centered in the cell
- scaled to fit the cell
- scaled proportionally to fit the cell

The usePictHeight parameter of ***PL_SetFormat*** will tell PrintList Pro whether to use a picture's original height, which is stored with the picture, when calculating the row height for the PrintList Pro area.

If you choose not to use the picture's height in the row height calculation and additional space is needed to print the picture, the numRowLines parameter of PL_SetHeight should be used to increase the row height.

# End of Page Callback Method

In 4th Dimension, a "callback" method is a project method called from an plug-in. PrintList Pro makes use of a callback method to inform you when the end of a printed page is reached. This enables you to perform any necessary processing associated with the end of the page, for example, changing information printed in the footer area of that page or the header area of the next page.

Use PL_SetPageProc to specify the 4D method PrintList Pro is to call. PrintList Pro will pass the method specified by callbackMethod two parameters: the first indicates which PrintList Pro area is calling the method, and the second specifies the last row printed on that page.

# Performance Issues with Formatting Commands

PrintList Pro uses an algorithm to automatically size the columns. Because of this, there is usually no need to use PL_SetWidths to manually size a column prior to printing a list. However, if the number of items in the list is very large (several thousand items with many columns), then the list might take a few seconds longer to generate, due to the automatic sizing calculation.

If this is the case, using PL_SetWidths will improve the generation time of the list. Text and string arrays will take the longest to automatically size.

Since you can use ***PL_SetWidths*** on just some of the columns, if you are printing very large arrays, but only one is text or string, you could use ***PL_SetWidths*** on just the text or string array, and let PrintList Pro automatically calculate the other column widths.

To determine the optimum width for a column, you can print out the pixel widths of columns in the headers during your design process and then use ***PL_SetWidths*** to set the width. See the PL_SetHdrOpts command for information on printing pixel widths.

PL_SetFormat does not affect the performance of PrintList Pro, regardless of the size of the arrays being printed.

# Borders and Frames

PL_SetCellBorder provides the ability to set the border style for a cell.

PL_SetCellFrame prints a frame around a range of cells.

Both commands use RGB colors.

# Header / Cell Icon Support

## The Escape Sentence System

PrintList Pro provides the ability to print icons in PrintList Pro headers (PL_SetHeaders) and cell data (PL_SetFormat), using picture data contained in the "cicn" or "PICT" resources, or items stored in the 4th Dimension Picture Library.

For example, when creating the arrays or header values, you can instruct PrintList Pro to print any picture type data.

An "escape sentence" system can be used for headers and individual cells. If any text (cell, header, etc.) contains an escape sentence, an icon is printed instead of the sentence. Based on the number, it may be a "cicn" resource, a "PICT" resource or a Picture Library object.

## Using Icons with Escape Sentences

To print an icon in the header, reference the icon resource as "^nnnHeader", where nnn is the desired "cicn" resource ID:

```
PL_SetHeaders(area;1;1;"^150Header")
```

To print the icon at the end of the text, reference the icon resource as "Header^nnn" where nnn is the desired "cicn" resource ID.

If you want to use "PICT" resources instead of "cicn", add the 4D constant Use PICT resource to the resource ID:

```
PL_SetHeaders(area;1;1;"^"+String(Use PICT resource+150) +"Header")
```

See the 4th Dimension Language Reference regarding the **SET LIST ITEM PROPERTIES** command, which uses the same icon syntax.

---

***When printing icons in headers, it may be necessary to adjust the header height to accommodate the height of the icon. You can use the PL_SetHeight routine to increase the size of an PrintList Pro header based on your requirements.***

---

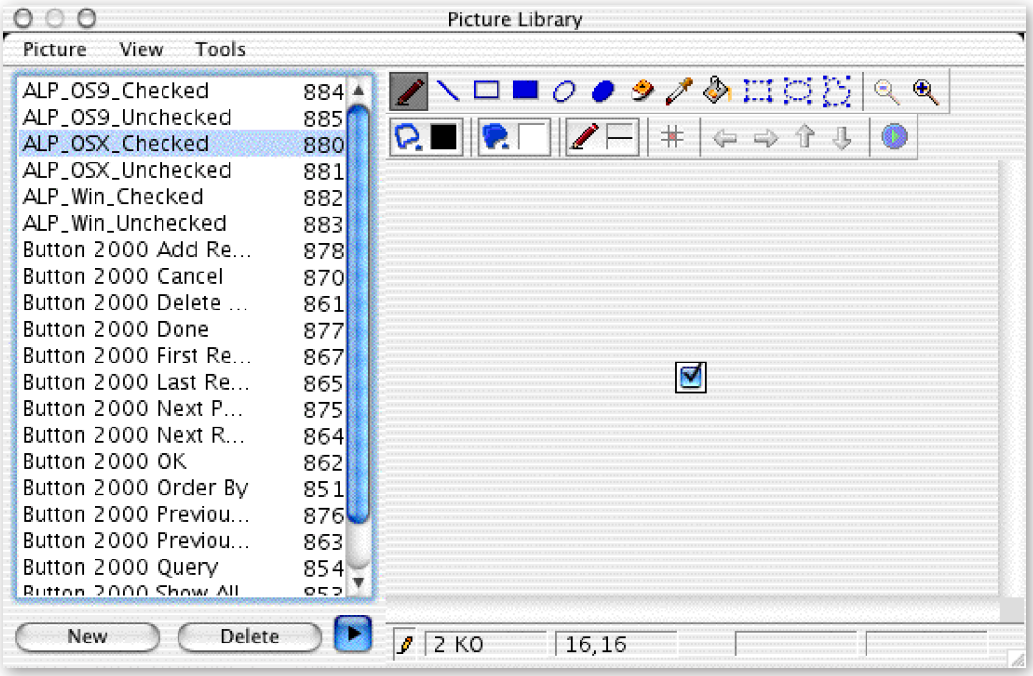
Similarly, if you wish to print icons in cell data, you would use the same technique when building the arrays for which you are using in the PrintList Pro area.

The default "escape" character (used in the call before the icon resource ID) can be modified with PL_SetMiscOptions.

## Using Picture Library Items with Escape Sentences

If you would like to use an item from the 4D Picture Library, you would reference the picture ID as "Use PicRef + N", where N is the reference number of a picture from the Design environment Picture Library.

Use PicRef is a 4D constant. See the 4th Dimension Language Reference regarding the **SET LIST ITEM PROPERTIES** command, which uses the same icon syntax.




Picture Library containing custom checkboxes

For example, if you would like to configure boolean columns to print custom checkbox icons instead of the traditional text (True;False), you can use the PL_SetFormat routine to provide references to icon resources contained in the 4D Picture Library.

```
$iconStr:="^"+String(Use PicRef + 880)+";"+"^"+String(Use PicRef + 881)
PL_SetFormat(eArea;1;$iconStr)
```

The default "escape" character (used in the call before the icon Picture Library ID) can be modified with PL_SetMiscOptions.

## Longint Reference System

Resources and Picture Library items are also used by PL_SetCellIcon, which places icons into individual cells.

This routine includes an iconRef parameter, which is one of the following:

- N, where N is the resource ID of Mac OS-based “cicn” resource
- Use PICT resource + N, where N is the the resource ID of a Mac OS-based “PICT” resource
- Use PicRef + N, where N is the reference number of a picture from the Design environment Picture Library
- pass zero (0) if you do not want any icon for the cell

## Picture Objects in Headers

In addition, PL_SetHeaderIcon provides the ability to procedurally place icons in column headers using 4D picture objects (fields or variables).

# Commands

## PL_Register

(registrationKey:S) → resultCode:L

| Parameter | Type | Description |
|---|---|---|
| → registrationKey | string | Registration key |
| ← resultCode | longint | Result code |

***PL_Register*** is used to register the PrintList Pro plug-in for standalone or server use.
You must call ***PL_Register*** with a valid registration key; otherwise PrintList Pro will operate in demonstration mode.

Without a valid registration key, PrintList Pro will operate in demonstration mode during 20 minutes.

Like all e-Node plug-ins, PrintList Pro offers six different license types. There are no such things as MacOS vs Windows or Development vs Deployment:

- **Single user license**. This license allows development (interpreted mode) or deployment (interpreted or compiled mode) on 4D Standalone or Runtime. Since the registration key is linked to a specific 4D license, you need to provide the number returned by the 4D command **GET SERIAL INFORMATION** (first parameter). A new license will be supplied for free at any time if you change your 4D version and/or get a new 4D registration key, provided that your previous licenses match the current public version at the exchange time.
- **Small server**. This license allows development (interpreted mode) or deployment (interpreted or compiled mode) on 4D Server up to 10 users. The registration key is linked to your 4D Server license just as above.
- **Medium server**. This license allows development (interpreted mode) or deployment (interpreted or compiled mode) on 4D Server up with 11 to 20 users. The registration key is linked to your 4D Server license just as above.
- **Large server**. This license allows development (interpreted mode) or deployment (interpreted or compiled mode) on 4D Server over 20 users. The registration key is linked to your 4D Server license just as above.
- **Unlimited Single User**. This license allows development (interpreted mode) or deployment (interpreted or compiled mode) on as many 4D Standalone, Runtime or Engine copies that run your 4D application(s). This is a yearly license, which expires after the date when it is to be renewed. The expiration only affects interpreted mode. **Compiled applications using an obsolete license will never expire**.
- **Unlimited OEM**. This license allows development (interpreted mode) or deployment (interpreted or compiled mode) on as many 4D Server (of any umber of users), 4D Standalone, Runtime or Engine copies that run your 4D application(s). This is a yearly license, which expires after the date when it is to be renewed. The expiration only affects interpreted mode. **Compiled applications using an obsolete license will never expire**.

A 4D database used to retrieve your 4D serial information is available from the following link:

http://www.e-node.net/ftp/GetSerialInfo

***The registration system has been modified in version 4.7. Only one registration key is now required.***

registrationKey — Pass the registration key to register your copy of PrintList Pro. Only one registration key is required. The key is either linked to the 4D or 4D Server serial number, or to the name of the company/developer, depending on the license type.

resultCode — This will return a value of 1 if the registration key is valid and a value of 0 if the registration key is invalid. You should verify the correctness of the registration key by tracing over the call to ***PL_Register*** and examining resultCode.

***Multiple calls to PL_Register are allowed. The plug-in will be activated if at least one valid key is used.***

Example:

```
C_LONGINT($result)
$result:=PL_Register("Place your registration key here")
If($result#1) `error
  ALERT("PrintList Pro could not be registered:"+String($result))
End if
```

Example with multiple calls:

```
C_LONGINT($result) `ignored in this case
$result:=PL_Register("Registration key one")
$result:=PL_Register("Registration key two")
$result:=PL_Register("Registration key three")
`etc.
```

## %PrintListPro

***%PrintListPro*** is the command used to identify the PrintList Pro plug-in area when you create a plug-in area object on a layout. This command is only used in the object definition for a PrintList Pro object, and should never be used as a command in a method.

## PL_SetArraysNam

(areaRef:L; columnNumber:I; numArrays:I; array1:S; …; arrayN:S) → resultCode:L

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |

| | | |
|---|---|---|
| → columnNumber | integer | Column at which to set the first array |
| → numArrays | integer | Number of arrays to set (up to 15) |
| → array1; …; arrayN | string | Names of 4D arrays |
| ← resultCode | integer | Result code |

***PL_SetArraysNam*** tells PrintList Pro what arrays to print. Up to fifteen arrays can be set at a time. Any 4D array type can be used except pointer and two-dimensional arrays.

Since PrintList Pro can print up to 512 arrays, this command may have to be used more than once.

There are three very important points to note about this command:

- This command must be called first, before any of the other commands, in the On Printing Detail phase.
- The columns must be added in sequential order, unless the particular column has already been added. In other words, to set 30 arrays, you must set arrays 1 through 15 prior to setting arrays 16 through 30.
- All arrays set with this command must have the same number of elements as each other and as any other arrays previously set.

You can pass process arrays and interprocess arrays to PrintList Pro, but not local arrays (a local array has a name that starts with a "$" character; an interprocess array has a name that starts with a "◊" character on MacOS and the "<>" characters on Windows).

One dimension of a two-dimensional array may be passed in the array1; …; arrayN parameters. For example: “my2DArray{1}” may be passed as array1.

areaRef — PrintList Pro area reference.

columnNumber — This parameter specifies the column number to set the first array being passed by this call of ***PL_SetArraysNam***.

numArrays — This parameter specifies the number of columns being set with this call to ***PL_SetArraysNam***.

resultCode — The possible values are:

| Constant | Value | Action |
|---|---|---|
| PL SetArrays Passed | 0 | |
| PL Not an array | 1 | Check to make sure all arrays are correctly typed |
| PL Wrong type of array | 2 | Pointer and two-dimensional arrays are not allowed |
| PL Wrong number of rows | 3 | Make sure that all arrays have the same number of elements |
| PL Maximum number of arrays exc | 4 | 512 arrays is the maximum |
| PL Not enough memory | 5 | Increase 4D’s RAM partition, or change your approach to use fewer or smaller arrays |

Examples:

```
Case of
  :(Form event=On Printing Detail)
    SELECTION TO ARRAY([Contacts]FN;aFN;[Contacts]LN;aLN;[Contacts]City;aCity;[Contacts]State;
      aState) `load the arrays
    $error:=PL_SetArraysNam(eNameList;1;4;"aFN";"aLN";"aCity";"aState") `starting at column 1,
      set 4 arrays to print through the plug-in area eNameList
End case

`Set up the eList PrintList Pro object with 25 arrays
`two calls must be made since only 15 arrays can be passed each time
$error:=PL_SetArraysNam(eList;1;15;"array1";"array2";"array3";"array4";"array5";"array6";
  "array7";"array8";"array9";"array10";"array11";"array12";"array13";"array14";"array15")
$error:=PL_SetArraysNam(eList;16;10;"array16";"array17";"array18";"array19";"array20";
  "array21";"array22";"array23";"array24";"array25")
```

# PL_SetHeaders

(areaRef:L; columnNumber:I; numHeaders:I; header1:S; …; headerN:S)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → columnNumber | integer | Column at which to set up the first header |
| → numHeaders | integer | Number of headers to set (up to 15) |
| → header1; …; headerN | string | Values to print in column headers |

***PL_SetHeaders*** is used to specify the value to print in the header for each column.
Up to fifteen headers can be set at a time.

The size of the header value is used by the automatic column sizing algorithm. If you are printing a fixed-string array with an element size of 2 characters, the column will be very narrow, unless you specify a header which contains several characters.

For example, states are usually stored in a database as a two-character alpha, and you would probably print them directly or load them into a string array sized for two-characters length. But if you specify a header of “State” the column will be sized about two and a half times wider.

If the header length is less than the values being printed in the column, then the header length will not affect the column width.

A, B, C, etc. will be printed in the headers if ***PL_SetHeaders*** is not used.

Examples:

```
$error:=PL_SetArraysNam(eNameList;1;4;"aFN";"aLN";"aCity";"aState")
PL_SetHeaders(eNameList;1;4;"First Name";"Last Name";"City";"State")

$error:=PL_SetArraysNam(eNames;1;2;"aFN";"aLN")
PL_SetHeaders(eNames;1;2;Field name([People]FirstName);Field name([People]LastName))
```

PrintList Pro provides the ability to print icons in PrintList Pro headers. See Header/Cell Icon Support for information about the use of ***PL_SetHeaders*** to print icons in column headers, using picture data contained in the "cicn" or "PICT" resources, or items stored in the 4th Dimension Picture Library.

---

## PL_SetHeaderIcon

(areaRef:L; columnNumber:I; iconAlignment:I picture:P; horPosition:I; vertPosition:I; offset:I; scaling:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → columnNumber | integer | Column at which to set the header icon |
| → iconAlignment | integer | Position of icon |
| → picture | picture | Icon or picture to use |
| → horPosition | integer | Horizontal position |
| → vertPosition | integer | Vertical position |
| → offset | integer | Pixel offset |
| → scaling | integer | Scaling |

***PL_SetHeaderIcon*** provides the ability to procedurally print icons in column headers. One or two icons may be used (left and right).

columnNumber — Desired header column number.

iconAlignment — Position of icon (a header can contain up to two icons):

**0** — places icon on left of header
**1** — places icon on right of header

picture — 4D picture object containing the icon (due to limitations of icons printing in headers, you must first load the desired icon into a 4D picture object).

horPosition — One the following options:

**0** — default (left for left icon, right for right icon)
**1** — align left
**2** — align center
**3** — align right

vertPosition — One the following options:

**0** — default (top)
**1** — align top
**2** — align center
**3** — align bottom

offset — Offset of the "icon guide". The horizontal position is relative to this position. If the horizontal alignment is center, the icon is centered between the guide and corresponding side of cell (left for left icon, right for right icon).

The picture below illustrates the icon guide and its offset:

Icon guide and offset

In the picture below, the left icon is aligned right to the icon guide and the right icon is aligned left to the icon guide:

Left icon aligned right - Right icon aligned left

In the picture below, the left icon is centered between the left border and the icon guide and no right icon is used:

Left icon centered

scaling — One the following options:

**0** — truncated
**1** — scaled

The cell content (text) is printed into the space that is left once the icon is printed. If the icon is larger than the remaining available space, the text is printed over the icon.

For example, if the column width is 100 pixels and you print a 15 pixel icon, there is remaining width of 85 pixels where the text will be printed. If, however, the total width (icon + text) exceeds the column width, the text will be printed over the picture. This allows background pictures behind the text.

The following example will use the same icon as PL_SetCellIcon, but it will first load the icon into a 4D picture object:

```
C_PICTURE($pict)
C_INTEGER($col;$iconAlign;$horPos;$verPos;$offset;$scaling)
$col:=3 `place icon in 3rd column
```

```
$iconAlign:=0 `print on left
$horPos:=0 `default
$verPos:=2 `align center
$offset:=5
$scaling:=0
GET PICTURE FROM LIBRARY(1717;$pict)
PL_SetHeaderIcon(PLParea;$col;$iconAlign;$pict;$horPos;$verPos;$offset;$scaling)
```

# PL_SetFormat

(areaRef:L; columnNumber:I; format:S; columnJust:I; headerJust:I; usePictHeight:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → columnNumber | integer | Column at which to set the format and justification |
| → format | string | Format to use |
| → columnJust | integer | Justification for column list items |
| → headerJust | integer | Justification for column header |
| → usePictHeight | integer | Use the picture height in the row height calculation |

***PL_SetFormat*** is used to control the format and justification of a column being printed.
You can control the format of string, integer, long integer, real, date, boolean, and picture columns with the format parameter. Time values can be formatted also, since they use long integer arrays. Any valid 4D format, including custom formats created in the Design environment, may be used with these column types, except for string arrays. Text columns cannot be formatted.

Additionally, null time and date values can be set to print a blank by appending a dash character ("-") to the format string parameter.

The defaults for the different column types are:

| Column Type | Format |
|---|---|
| Integer | "##,##0" |
| Long Integer | "#,###,##0" |
| Real | "#,###,##0.00" |
| Boolean | "True;False" |
| Date | "0" |
| Picture | "0" |

format (for string arrays) — Any formatting characters supported for 4D are allowed.
Pre-defined styles (i.e. those saved in the Design environment) are not allowed.

format (for text arrays) — Not supported.

format (for numeric arrays) — See the 4D command **String** in the 4D Language Reference for the possible values. Any valid 4D numeric format may be used.

format (for boolean arrays) — The string contains two formats, one for the **True** value, the other for the **False** value, separated by a semicolon. Examples: "Male;Female" and "MacOS;Windows."

format (for date arrays) — See the 4D command **String** in the 4D Language Reference for the possible values. Any valid 4D date format may be used. Examples: "0" or "3" are valid formats.

| Format | Example |
|---|---|
| 0 | 09/20/07 (default) |
| 1 | 9/20/07 |
| 2 | Thu, Sep 20, 2007 |
| 3 | Thursday, September 20, 2007 |
| 4 | 09/20/07 or 09/20/1997 |
| 5 | September 20, 2007 |
| 6 | Sep 20, 2007 |

format (for "time" arrays) — See the 4D **String** command in the 4D Language Reference, and the 4D Design Reference discussion of formatting for the possible values. There are no time arrays in 4D as such, they are in reality long integer arrays. These arrays are printed as time ***PL_SetFormat*** values by using the proper format. The format is the two character sequence "&/" followed by the number given in the discussion of the **String** command. For example, one proper format for a time array would be "&/2".

| Format | Example |
|---|---|
| 1 | 01:02:03 |
| 2 | 01:02 |
| 3 | 1 hour 2 minutes 3 seconds |
| 4 | 1 hour 2 minutes |
| 5 | 1:02 AM |

format (for picture arrays):

**0** — the picture will be truncated, if necessary, and justified to the upper left (default)
**1** — the picture will be truncated, if necessary, and centered in the cell
**2** — the picture will be scaled to fit the cell
**3** — the picture will be scaled to fit the cell, and remain proportional to its original size

columnJust and headerJust — The justification for a column and its header can be controlled independently. The possible values are:

| Value | Justification |
|---|---|
| 0 | Default |
| 1 | Left |
| 2 | Center |
| 3 | Right |

By default, headers are left justified, unless the column elements are center justified. In that case, the header will default to center justification.

The default column justifications for the different column types are:

| Column Type | Default Column Justification |
|---|---|
| Integer | right |
| Long Integer (including Time) | right |
| Real | right |
| Boolean | left |
| Date | right |
| String | left |
| Text | left |
| Picture | n/a — see the format parameter |

The columnJust parameter is ignored for picture columns. Use the format parameter to justify picture columns.

usePictHeight:

**0** — ignore the picture height when calculating the row height (default)
**1** — use height of the largest picture when calculating the row height

If the column columnNumber does not have a picture column, this parameter will be ignored.

***If the list is configured to automatically calculate variable height rows, then picture array elements are always included in the automatic calculation, and this parameter is ignored. See*** PL_SetHeight ***and*** Variable Height Rows ***for more information.***

Examples:

```
`Format a real column (3rd column), default column justification, center header justification
PL_SetFormat(names;3;"$###,###.00";0;2;0)

`Format a string (2nd column), default column justification and default header justification
PL_SetFormat(eContacts;2;"(###) ###-####";0;0;0)

`Format a boolean column (4th column), right column justification and left header justification
PL_SetFormat(eList;4;"Male;Female";3;1;0)

`Format style 3 for a date column, default justification (5th column), default column and header justification,
  suppress null dates
PL_SetFormat(eNames;5;"3-")

`Format style 2 for a time column, right justification for header and column (7th column)
PL_SetFormat(eList;7;"&/2";3;3;0)

`Custom format style, default justification for column, center header (5th column)
PL_SetFormat(eNames;5;"|Dollars";0;2;0)

`Scale picture column to fit proportionally (1st column), use default header justification,
  use picture size in row height calculation
PL_SetFormat(ePeople;1;"3";0;0;1)
```

## PL_SetWidths

(areaRef:L; columnNumber:I; numWidths:I; width1:I; …; widthN:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → columnNumber | integer | Column at which to set the first width |
| → numWidths | integer | Number of widths to set (up to 15) |
| → width1; …; widthN | integer | Pixel widths of columns |

***PL_SetWidths*** is used to set the pixel width for one or more columns. Up to fifteen widths can be set at a time.

A width of zero forces a column to be sized automatically based on its data type.

A column cannot be less than 3 pixels wide. If you pass a value of less than 3 but greater than zero, PrintList Pro will ignore it and use 3. PrintList Pro will not let a column be wider than the width of the list area minus 20.

If not called, the default width for all columns is determined based on the type of array or field printed in the column.

Example:

```
$error:=PL_SetArraysNam(eNames;1;5;"aFN";"aLN";"aCity";"aState";"aZip")
PL_SetWidths(eNames;1;5;150;50;0;100;0) `0 forces autosizing for that column
```

## PL_SetHdrStyle

(areaRef:L; columnNumber:I; fontName:S; size:I; styleNum:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → columnNumber | integer | Column for which to set the header style |
| → fontName | string | Name of the font to use |
| → size | integer | Size of the font |
| → styleNum | integer | Style of the font |

***PL_SetHdrStyle*** is used to control the appearance of the PrintList Pro column headers. The columns can be controlled individually or as a group.

columnNumber — This parameter specifies what column header to apply the style to. Use a value of zero (0) to apply the parameters to all columns.

fontName — Use this parameter to specify the font for the specified columnNumber. If not called, or the specified fontName is not found, the header(s) will be printed in the OS defined System Font. If the font specified by fontName is not installed, then the System Font will be used.

styleNum — The styleNum is a font style code. By adding the codes together, you can combine styles. The numeric codes for styleNum are shown below:

| Style | Number |
|---|---|
| Plain | 0 |
| Bold | 1 |
| Italic | 2 |
| Underline | 4 |
| Outline | 8 |
| Shadow | 16 |
| Condensed | 32 |
| Extended | 64 |

Examples:

***PL_SetHdrStyle***(eList;1;"Geneva";12;1) `Geneva 12 point bold, column 1

***PL_SetHdrStyle***(Names;3;"New York";12;3) `New York 12 point bold italic, column 3

***PL_SetHdrStyle***(Names;0;"Palatino";10;3) `Palatino 10 point bold italic, all columns

---

# PL_SetHdrOpts

(areaRef:L; printHeaders:I; printPixelWidth:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → printHeaders | integer | Print the headers above the list |
| → printPixelWidth | integer | Print column widths in the header |

***PL_SetHdrOpts*** is used to control several PrintList Pro options pertaining to column headers.

printHeaders:

**0** — no headers will be printed (default)
**1** — only one cell at a time may be selected (single cell selection)
**2** — headers will be printed only on the first page
**3** — headers will be printed on all pages

printPixelWidth — Used during development to allow you to easily determine what pixel width looks best for each column:

**0** — the normal header text will be printed (default)

**1** — the width of the column will be printed in each header

Examples:

***PL_SetHdrOpts***(eList;2;0) `print headers on all pages, no pixel widths

***PL_SetHdrOpts***(eList;1;1) `print headers on first page, and pixel widths

---

## PL_SetMiscOptions

(areaRef:L; escapeChar:S; useEllipsis:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → escapeChar | string | Escape character |
| → useEllipsis | integer | Use ellipsis |

***PL_SetMiscOptions*** is used to control miscellaneous PrintList Pro options.

escapeChar — Sets the alternate escape character used to inform PrintList Pro where icon references exist in your cell data or headers.

You have the ability to include icons within PrintList Pro headers and cell data using a formatted character (default ^) to informing PrintList Pro where to look for the icons.

For more details on using header and cell data icons, please refer to the Header/Cell Icon Support section.

For compatibility with previous PrintList Pro versions, the default value for escapeChar is the empty string (no escape character).

useEllipsis — Determines if auto-ellipsis is used when columns are smaller than the printed data:

**0** — use ellipsis in header and column data

**1** — don't use ellipsis in header and column data (default)

The following example will print the "cicn" resource with a resID of 150 in the header before the header text:

***PL_SetMiscOptions***(area;"~";0) `set escape to tilde ~, do not use ellipsis

***PL_SetHeaders***(area;1;1;"~150Header")

The following example will mimic AreaList Pro's default behavior:

***PL_SetMiscOptions***(area;"^";0)

# PL_SetStyle

(areaRef:L; columnNumber:I; fontName:S; size:I; styleNum:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → columnNumber | integer | Column for which to set the style |
| → fontName | string | Name of the font to use |
| → size | integer | Size of the font |
| → styleNum | integer | Style of the font |

***PL_SetStyle*** is used to control the appearance of the PrintList Pro columns. The columns can be controlled individually or as a group.

columnNumber — This parameter specifies what column to apply the style to. Use a value of zero (0) to apply the parameters to all columns.

fontName — Use this parameter to specify the font for the specified columnNumber. If not called, or the specified fontName is not found, the column(s) will be printed in the OS defined System Font. If the font specified by fontName is not installed, then the System Font will be used.

styleNum — The styleNum is a font style code. By adding the codes together, you can combine styles. The numeric codes for styleNum are shown below:

| Style | Number |
|---|---|
| Plain | 0 |
| Bold | 1 |
| Italic | 2 |
| Underline | 4 |
| Outline | 8 |
| Shadow | 16 |
| Condensed | 32 |
| Extended | 64 |

Examples:

```
PL_SetStyle(eNames;0;"Geneva";9;0) `Geneva 9 plain, all columns
PL_SetStyle(eList;4;"Helvetica";12;32) `Helvetica 12 point condensed, 4th column
PL_SetStyle(eNames;1;"Times";9;1) `Times 9 point bold, 1st column
```

# PL_SetForeClr

(areaRef:L; columnNumber:I; plpHdrForeColor:S; 4dHdrForeColor:I; plpListForeColor:S; 4dListForeColor:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → columnNumber | integer | Column number |
| → plpHdrForeColor | string | Header foreground color from PrintList Pro's palette |
| → 4dHdrForeColor | integer | Header foreground color from 4D's palette |
| → plpListForeColor | string | List foreground color from PrintList Pro's palette |
| → 4dListForeColor | integer | List foreground color from 4D's palette |

***PL_SetForeClr*** is used to specify the foreground colors for a column header and a list area column.

PrintList Pro has its own palette, with the following colors: white, black, blue, green, yellow, magenta, red, cyan, gray, light gray.

columnNumber — The column for which to set the foreground color. Use a value of zero (0) for columnNumber to apply the parameters to all columns.

plpHdrForeColor — Name of the color in PrintList Pro's palette. This will be the foreground color for the column header. If the name is not in PrintList Pro's palette or it is a null string, then 4dHdrForeColor will be used.

4dHdrForeColor — 1 to 256. The color at this position in 4D's palette will be used for the foreground color for the column header.

plpListForeColor — Name of the color in PrintList Pro's palette. This will be the foreground color for the column. If the name is not in PrintList Pro's palette or it is a null string, then 4dListForeColor will be used.

4dListForeColor — 1 to 256. The color at this position in 4D's palette will be used for the foreground color for the column.

If ***PL_SetForeClr*** is not called, the default is black for both the header and list foreground colors.

Examples:

```
`Red for column header foreground, light gray for column foreground (all columns)
PL_SetForeClr(eNames;0;"Red";0;"Light Gray";0)

`Green for column header foreground, 13th color from 4D's palette for column foreground (4th column)
PL_SetForeClr(eNames;4;"Green";0;"";13)
```

## PL_SetForeRGBColor

(areaRef:L; columnNumber:L; hdrForeRed:L; hdrForeGreen:L; hdrForeBlue:L; listForeRed:L; listForeGreen:L; listForeBlue:L)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → columnNumber | longint | Column number |
| → hdrForeRed | longint | Header fore red |
| → hdrForeGreen | longint | Header fore green |
| → hdrForeBlue | longint | Header fore blue |
| → listForeRed | longint | List fore red |
| → listForeGreen | longint | List fore green |
| → listForeBlue | longint | List fore blue |

***PL_SetForeRGBColor*** is used to specify the foreground colors for a column header and a list area column, using the RGB values. This routine is similar to PL_SetForeClr.

hdrForeRed — Desired header foreground red component in RGB color pattern.

hdrForeGreen — Desired header foreground green component in RGB color pattern.

hdrForeBlue — Desired header foreground blue component in RGB color pattern.

listForeRed — Desired list foreground red component in RGB color pattern.

listForeGreen — Desired list foreground green component in RGB color pattern.

listForeBlue — Desired list foreground blue component in RGB color pattern.

The following example will tell PrintList Pro to print the third column using a color scheme standard for OSX:

```
PL_SetForeRGBColor(xArea;3;237;254;243;237;254;243)
```

## PL_SetBackClr

(areaRef:L; plpHdrBackColor:S; 4dHdrBackColor:I; plpListBackColor:S; 4dListBackColor:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → plpHdrBackColor | string | Header background color from PrintList Pro's palette |
| → 4dHdrBackColor | integer | Header background color from 4D's palette |
| → plpListBackColor | string | List background color from PrintList Pro's palette |
| → 4dListBackColor | integer | List background color from 4D's palette |

***PL_SetBackClr*** is used to specify the background colors for the header and list area.

While the foreground color can be specified for each column, the background color for the header or the list area can only be specified for all columns using this command. You need to use PL_SetColBackColor or PL_SetColBackRGBColor to set the background colors of each column's header and each column itself.

PrintList Pro has its own palette, with the following colors: white, black, blue, green, yellow, magenta, red, cyan, gray, light gray.

plpHdrBackColor — Name of the color in PrintList Pro's palette. This will be the background color for the column header. If the name is not in PrintList Pro's palette or it is a null string, then 4dHdrBackColor will be used.

4dHdrBackColor — 1 to 256. The color at this position in 4D's palette will be used for the background color for the column header.

plpListBackColor — Name of the color in PrintList Pro's palette. This will be the background color for the column. If the name is not in PrintList Pro's palette or it is a null string, then 4dListBackColor will be used.

4dListBackColor — 1 to 256. The color at this position in 4D's palette will be used for the background color for the column.

If ***PL_SetBackClr*** is not called, the default is white for both the header and list background colors.

Examples:

```
`Light gray for header background, white for list background, all columns
PL_SetBackClr(eNames;0;"Light Gray";0;"White";0)

`White for header background, 13th color from 4D's palette for list background, 1st column
PL_SetBackClr(eNames;1;"White";0;"";13)
```

## PL_SetBackRGBColor

(areaRef:L; hdrBackRed:L; hdrBackGreen:L; hdrBackBlue:L; listBackRed:L; listBackGreen:L; listBackBlue:L; ftrBackRed:L; ftrBackGreen:L; ftrBackBlue:L)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → hdrBackRed | longint | Header back red |
| → hdrBackGreen | longint | Header back green |
| → hdrBackBlue | longint | Header back blue |
| → listBackRed | longint | List back red |
| → listBackGreen | longint | List back green |
| → listBackBlue | longint | List back blue |
| → ftrBackRed | longint | Footer back red |
| → ftrBackGreen | longint | Footer back green |
| → ftrBackBlue | longint | Footer back blue |

***PL_SetBackRGBColor*** is used to specify the background colors for the header and list area, using the RGB values. This routine is similar to PL_SetBackClr.

While the foreground color can be specified for each column, the background color for the header or the list area can only be specified for all columns using this command. You need to use PL_SetColBackColor or PL_SetColBackRGBColor to set the background colors of each column's header and each column itself.

hdrBackRed — Desired header background red component in RGB color pattern.

hdrBackGreen — Desired header background green component in RGB color pattern.

hdrBackBlue — Desired header background blue component in RGB color pattern.

listBackRed — Desired list background red component in RGB color pattern.

listBackGreen — Desired list background green component in RGB color pattern.

listBackBlue — Desired list background blue component in RGB color pattern.

ftrBackRed — Desired footer background red component in RGB color pattern.

ftrBackGreen — Desired footer background green component in RGB color pattern.

ftrBackBlue — Desired footer background blue component in RGB color pattern.

The following example will tell PrintList Pro to print the list using a color scheme standard for OSX:

```
PL_SetBackRGBColor(xArea;237;254;243;237;254;243;237;254;243)
```

## PL_SetColBackColor

(areaRef:L; columnNumber:I; plpHdrBackColor:S; 4dHdrBackColor:I; plpListBackColor:S; 4dListBackColor:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → columnNumber | integer | Column number |
| → plpHdrBackColor | string | Header background color from PrintList Pro's palette |
| → 4dHdrBackColor | integer | Header background color from 4D's palette |
| → plpListBackColor | string | List background color from PrintList Pro's palette |
| → 4dListBackColor | integer | List background color from 4D's palette |

***PL_SetColBackColor*** is used to specify the background colors for a column header and a list area column.

PrintList Pro has its own palette, with the following colors: white, black, blue, green, yellow, magenta, red, cyan, gray, light gray.

columnNumber — The column for which to set the background color. Use a value of zero (0) for columnNumber to apply the parameters to all columns.

plpHdrBackColor — Name of the color in PrintList Pro's palette. This will be the background color for the column header. If the name is not in PrintList Pro's palette or it is a null string, then 4dHdrBackColor will be used.

4dHdrBackColor — 1 to 256. The color at this position in 4D's palette will be used for the background color for the column header.

plpListBackColor — Name of the color in PrintList Pro's palette. This will be the background color for the column. If the name is not in PrintList Pro's palette or it is a null string, then 4dListBackColor will be used.

4dListBackColor — 1 to 256. The color at this position in 4D's palette will be used for the background color for the column.

If ***PL_SetColBackColor*** is not called, the default is white for both the header and list background colors.

Examples:

```
`Light gray for header background, white for list background, all columns, gray for the footer background
PL_SetColBackColor(eNames;0;"Light Gray";0;"White";0;"Gray";0)

`White for header background, 13th color from 4D's palette for list background, 1st column,
  color 246 from 4D's palette for footer background
PL_SetColBackColor(eNames;1;"White";0;"";13;"";246)
```

## PL_SetColBackRGBColor

(areaRef:L; columnNumber:L; hdrBackRed:L; hdrBackGreen:L; hdrBackBlue:L; listBackRed:L; listBackGreen:L; listBackBlue:L)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → columnNumber | longint | Column number |
| → hdrBackRed | longint | Header back red |
| → hdrBackGreen | longint | Header back green |
| → hdrBackBlue | longint | Header back blue |
| → listBackRed | longint | List back red |
| → listBackGreen | longint | List back green |
| → listBackBlue | longint | List back blue |

***PL_SetColBackRGBColor*** is used to specify the background colors for a column header and a list area column, using the RGB values. This routine is similar to PL_SetColBackColor.

columnNumber — The column for which to set the background color. Use a value of zero (0) for columnNumber to apply the parameters to all columns.

hdrBackRed — Desired header background red component in RGB color pattern.

hdrBackGreen — Desired header background green component in RGB color pattern.

hdrBackBlue — Desired header background blue component in RGB color pattern.

listBackRed — Desired list background red component in RGB color pattern.

listBackGreen — Desired list background green component in RGB color pattern.

listBackBlue — Desired list background blue component in RGB color pattern.

The following example will tell PrintList Pro to print the third column using a color scheme standard for OSX:

```
PL_SetColBackRGBColor(xArea;3;237;254;243;237;254;243;237;254;243)
```

## PL_SetRowStyle

(areaRef:L; rowNumber:L; styleNum:I; fontName:S; fontSize:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → rowNumber | longint | Number of row |
| → styleNum | integer | Style of the font |
| → fontName | string | Name of the font |
| → fontSize | integer | Size of the font |

***PL_SetRowStyle*** is used to set the style and font for a particular row. It will override the style and font settings for all columns in that row. The size settings of each column will still apply.

Any subsequent sorting using PL_SetSort will cause the row style setting to be moved with the arrays. This will keep the style setting "in sync" with the original row.

***Keep in mind that any settings applied to a row will be moved with that row's data if the data is later sorted using PL_SetSort. If you do not want the row's settings to move, call PL_SetSort before applying the row settings.***

rowNumber — The row for which to set the style. Use a value of zero (0) for rowNumber to apply the parameters to all rows.

styleNum — This parameter is used to set the style for the row. The different values in the table below can be added together to produce combinations of styles. For example, bold italic has a value of 3.

| Style | Number |
|---|---|
| Plain | 0 |
| Bold | 1 |
| Italic | 2 |
| Underline | 4 |
| Outline | 8 |
| Shadow | 16 |
| Condensed | 32 |
| Extended | 64 |

If a row style has been previously set, it may be removed by setting styleNum to -1. This may also be applied to all rows by passing a zero (0) for the rowNumber. This will have no effect on rows that have not been previously set.

The row style may be left unchanged by setting styleNum to 256.

fontName — This parameter specifies the font for a row. The row font may be left unchanged by setting fontName to the empty string (""). If the font specified is not found, it will be treated as an empty string and ignored.

fontSize — This specifies the font size for a row. The row font size may be left unchanged by setting fontSize to 0.

Examples:

```
PL_SetRowStyle(eNames;10;2;"";0) `set row 10 to be italic - no change in font size
PL_SetRowStyle(eNames;0;1;"Helvetica";14) `set all rows to be bold, Helvetica 14
PL_SetRowStyle(eList;12;3;"Times";0) `set the 12th row to print the Times font in bold italic style
```

## PL_SetRowColor

(areaRef:L; rowNumber:L; plpRowForeColor:S; 4dRowForeColor:L; plpRowBackColor:S; 4dRowBackColor:L)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → rowNumber | longint | Number of row |
| → plpRowForeColor | string | Row foreground color from PrintList Pro's palette |
| → 4dRowForeColor | longint | Row foreground color from 4D's palette |
| → plpRowBackColor | string | Row background color from PrintList Pro's palette |
| → 4dRowBackColor | longint | Row background color from 4D's palette |

***PL_SetRowColor*** is used to specify the foreground and background colors for a row. It will override the foreground and background color settings for all columns in that row. Any subsequent sorting using PL_SetSort will cause the row color setting to be moved with the arrays. This will keep the color setting "in sync" with the original row.

***Keep in mind that any settings applied to a row will be moved with that row's data if the data is later sorted using PL_SetSort. If you do not want the row's settings to move, call PL_SetSort before applying the row settings.***

PrintList Pro has its own palette, with the following colors: white, black, blue, green, yellow, magenta, red, cyan, gray, light gray.

rowNumber — The row for which to set the foreground color. Use a value of zero (0) for rowNumber to apply the parameters to all rows.

plpRowForeColor — Name of the color in PrintList Pro's palette. This will be the foreground color for the row. If the name is not in PrintList Pro's palette or it is a null string, then 4dRowForeColor will be used.

4dRowForeColor — 1 to 256. Foreground color number for the row (from 4D's palette). The row foreground color may be left unchanged by setting plpRowForeColor to the empty string (""), and 4dRowForeColor to 0.

If a row color has been previously set, it may be removed by setting plpRowForeColor to an empty string (""), and 4dRowForeColor to -1. This may also be applied to all rows by passing a zero (0) for the rowNumber. This will have no effect on rows that have not been previously set.

plpRowBackColor — Name of the color in PrintList Pro's palette. This will be the background color for the row. If the name is not in PrintList Pro's palette or it is the empty string (""), then 4dRowBackColor will be used.

4dRowBackColor —1 to 256. Background color number for the row (from 4D's palette). The row background color may be left unchanged by setting plpRowBackColor to the empty string (""), and 4dRowBackColor to 0.

If a row background color has been previously set, it may be removed by setting plpRowBackColor to the empty string (""), and 4dRowBackColor to -1. This may also be applied to all rows by passing a zero (0) for the row number. This will have no effect on rows that have not been previously set.

Examples:

***PL_SetRowColor***(eNames;10;"Blue";0;"Light gray";0) `set row 10 to foreground blue, background light gray

***PL_SetRowColor***(eNames;0;"Blue";0;"Yellow";0) `set all rows to blue foreground, yellow background

***PL_SetRowColor***(eNames;0;"";-1;"";-1) `reset all row colors to use the column color settings

***PL_SetRowColor***(eList;10;"Blue";0;"Light Gray";0)`set the 10th row to print a foreground color of blue and background color of light gray

***PL_SetRowColor***(eList;12;"Green";0;"";0) `set the 12th row to print a foreground color of green and the current background color

## PL_SetRowRGBColor

(areaRef:L; rowNumber:L; rowForeRed:L; rowForeGreen:L; rowForeBlue:L; rowBackRed:L; rowBackGreen:L; rowBackBlue:L)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → rowNumber | longint | Row number |
| → rowForeRed | longint | Foreground red |
| → rowForeGreen | longint | Foreground green |
| → rowForeBlue | longint | Foreground blue |
| → rowBackRed | longint | Background red |
| → rowBackGreen | longint | Background green |
| → rowBackBlue | longint | Background blue |

***PL_SetRowRGBColor*** provides the ability to set the foreground and background colors for an individual row using standard RGB colors. This routine is similar to PL_SetRowColor, except that it uses RGB color values.

rowForeRed — Desired foreground red component in RGB color pattern.

rowForeGreen — Desired foreground green component in RGB color pattern.

rowForeBlue — Desired foreground blue component in RGB color pattern.

rowBackRed — Desired background red component in RGB color pattern.

rowBackGreen — Desired background green component in RGB color pattern.

rowBackBlue — Desired background blue component in RGB color pattern.

The following example will tell PrintList Pro to print the third row using a color scheme standard for OSX:

```
PL_SetRowRGBColor(xArea;3;237;0;243;0;254;0)
```

## PL_SetDividers

(areaRef:L; colDividerWidth:F; colDividerPattern:S; plpColDividerColor:S; 4dColDividerColor:I; rowDividerWidth:F; rowDividerPattern:S; plpRowDividerColor:S; 4dRowDividerColor:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → colDividerWidth | real | Width of the column divider line |
| → colDividerPattern | string | Pattern of the column divider |
| → plpColDividerColor | string | Color from PrintList Pro's palette for the column divider |
| → 4dColDividerColor | integer | Color from 4D's palette for the column divider |
| → rowDividerWidth | real | Width of the row divider line |
| → rowDividerPattern | string | Pattern of the row divider |
| → plpRowDividerColor | string | Color from PrintList Pro's palette for the row divider |
| → 4dRowDividerColor | integer | Color from 4D's palette for the row divider |

***PL_SetDividers*** is used to set the pattern and color of the column and row dividers.

These are the available patterns: white, black, gray, light gray, and dark gray.

PrintList Pro has its own palette, with the following colors: white, black, blue, green, yellow, magenta, red, cyan, gray, light gray.

colDividerWidth — 0 to 1. This option controls the line width of the column dividers. A value of 0.25 pixel should be used for hairlines. A value of 0 means that no dividers will be printed.

colDividerPattern — Name of the pattern for the column divider. If a null string is used then no column divider will be printed.

plpColDividerColor — Name of the color in PrintList Pro's palette. This will be the color for the column divider. If the name is not in PrintList Pro's palette or it is a null string, then 4dColDividerColor will be used.

4dColDividerColor — 1 to 256. The color at this position in 4D's palette will be used for the column divider.

rowDividerWidth — 0 to 1. This option controls the line width of the row dividers. A value of 0.25 pixel should be used for hairlines. A value of 0 means that no dividers will be printed.

rowDividerPattern — Name of the pattern for the row divider. If a null string is used then no row divider will be printed.

plpRowDividerColor — Name of the color in PrintList Pro's palette. PrintList Pro has its own palette, with the following colors: white, black, blue, green, yellow, magenta, red, cyan, gray, light gray. This will be the color for the row divider. If the name is not in PrintList Pro's palette or it is a null string, then 4dRowDividerColor will be used.

4dRowDividerColor — 1 to 256. The color at this position in 4D's palette will be used for the row divider.

If neither ***PL_SetDividers*** nor PL_SetRGBDividers are called, then no column or row dividers will be printed.

Examples:

```
`Print solid gray column dividers and no row dividers
PL_SetDividers(eNames;1;"Black";"Gray";0;0;"";"";0)

`Print column and row hairline dividers in a gray pattern
PL_SetDividers(eNames;0.25;"Gray";"Black";0;0.25;"Gray";"Black";0)
```

## PL_SetRGBDividers

(areaRef:L; colDividerWidth:F; colDividerPattern:S; colDividerRed:L; colDividerGreen:L; colDividerBlue:L; rowDividerWidth:F; rowDividerPattern:S; rowDividerRed:L; rowDividerGreen:L; rowDividerBlue:L)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → colDividerWidth | real | Width of the column divider line |
| → colDividerPattern | string | Column divider pattern string |
| → colDividerRed | longint | Column divider — Red |
| → colDividerGreen | longint | Column divider — Green |
| → colDividerBlue | longint | Column divider — Blue |
| → rowDividerWidth | real | Width of the row divider line |
| → rowDividerPattern | string | Row divider pattern string |
| → rowDividerRed | longint | Row divider — Red |
| → rowDividerGreen | longint | Row divider — Green |
| → rowDividerBlue | longint | Row divider — Blue |

***PL_SetRGBDividers*** functions the same as the PL_SetDividers routine, except that the column and row divider colors use standard RGB values.

colDividerWidth — 0 to 1. This option controls the line width of the column dividers. A value of 0.25 pixel should be used for hairlines. A value of 0 means that no dividers will be printed.

colDividerPattern — String, name of the pattern for the column divider. If a null string is used then no column divider will be printed.

colDividerRed — Column divider RGB red component.

colDividerGreen — Column divider RGB green component.

colDividerBlue — Column divider RGB blue component.

rowDividerWidth — 0 to 1. This option controls the line width of the row dividers. A value of 0.25 pixel should be used for hairlines. A value of 0 means that no dividers will be printed.

rowDividerPattern — String, name of the pattern for the row divider. If a null string is used then no row divider will be printed.

rowDividerRed — Row divider RGB red component.

rowDividerGreen — Row divider RGB green component.

rowDividerBlue — Row divider RGB blue component.

If neither PL_SetDividers nor ***PL_SetRGBDividers*** are called, then no column or row dividers will be printed.

The following example will set the column/row dividers using the ***PL_SetRGBDivider***s routine:

```
`Print column and row dividers in a hairline gray pattern
PL_SetRGBDividers(eNames;0.25;"Gray";209; 209; 209;0.25;"Gray"; 209; 209; 209)
```

# PL_SetFrame

(areaRef:L; frameLineWidth:F; frameLinePattern:S; plpFrameLineColor:S; 4dFrameLineColor:I; headerLineWidth:F; headerLinePattern:S; plpHeaderLineColor:S; 4dHeaderLineColor:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → frameLineWidth | real | Width of the frame line |
| → frameLinePattern | string | Pattern of the frame line |
| → plpFrameLineColor | string | Color from PrintList Pro's palette for the frame |
| → 4dFrameLineColor | integer | Color from 4D's palette for the frame |
| → headerLineWidth | real | Width of the header separator |
| → headerLinePattern | string | Pattern of the header separator |
| → plpHeaderLineColor | string | Color from PrintList Pro's palette for the header separator |
| → 4dHeaderLineColor | integer | Color from 4D's palette for the header separator |

***PL_SetFrame*** is used to set the pattern and color of the frame and header separator lines.

These are the available patterns: white, black, gray, light gray, and dark gray.

PrintList Pro has its own palette, with the following colors: white, black, blue, green, yellow, magenta, red, cyan, gray, light gray.

frameLineWidth — 0 to 1. This option controls the line width of the frame. A value of 0.25 pixel should be used for hairlines. A value of 0 means that no frame will be printed.

frameLinePattern — Name of the pattern for the frame. If a null string is used then no frame will be printed.

plpFrameLineColor — Name of the color in PrintList Pro's palette. This will be the color for the frame. If the name is not in PrintList Pro's palette or it is a null string, then 4dFrameLineColor will be used.

4dFrameLineColor — 1 to 256. The color at this position in 4D's palette will be used for the frame.

headerLineWidth — 0 to 1. This option controls the line width of the header separator. A value of 0.25 pixel should be used for hairlines. A value of 0 means that no header separator will be printed.

headerLinePattern — Name of the pattern for the header separator. If a null string is used then no header separator will be printed.

plpHeaderLineColor — Name of the color in PrintList Pro's palette. PrintList Pro has its own palette, with the following colors: white, black, blue, green, yellow, magenta, red, cyan, gray, light gray. This will be the color for the header separator. If the name is not in PrintList Pro's palette or it is a null string, then 4dHeaderLineColor will be used.

4dHeaderLineColor — 1 to 256. The color at this position in 4D's palette will be used for the header separator.

If neither ***PL_SetFrame*** nor PL_SetRGBFrame are called, then no frame or header separator line will be printed.

Examples:

```
`Print 1 pixel wide, solid gray header separator and no frame
PL_SetFrame (eNames;0;"";"";0;1;"Black";"Gray";0)

`Print hairline, solid black frame and header separator line
PL_SetFrame (eNames;0.25;"Black";"Black";0;0.25;"Black";"Black";0)
```

## PL_SetRGBFrame

(areaRef:L; frameLineWidth:F; frameLinePattern:S; frameLineRed:L; frameLineGreen:L; frameLineBlue:L; headerLineWidth:F; headerLinePattern:S; headerLineRed:L; headerLineGreen:L; headerLineBlue:L;)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → frameLineWidth | real | Width of the frame line |

| | | |
|---|---|---|
| → frameLinePattern | string | Pattern of the frame line |
| → frameLineRed | longint | Frame line — Red |
| → frameLineGreen | longint | Frame line — Green |
| → frameLineBlue | longint | Frame line — Blue |
| → headerLineWidth | real | Width of the header separator |
| → headerLinePattern | string | Pattern of the header separator |
| → headerLineRed | longint | Header separator — Red |
| → headerLineGreen | longint | Header separator — Green |
| → headerLineBlue | longint | Header separator — Blue |

***PL_SetRGBFrame*** functions the same as the PL_SetFrame routine, except that the frame and header separator colors use standard RGB values.

frameLineWidth — 0 to 1. This option controls the line width of the frame. A value of 0.25 pixel should be used for hairlines. A value of 0 means that no frame will be printed.

frameLinePattern — Name of the pattern for the frame. If a null string is used then no frame will be printed.

frameLineRed — Frame line RGB red component.

frameLineGreen — Frame line RGB green component.

frameLineBlue — Frame line RGB blue component.

headerLineWidth — 0 to 1. This option controls the line width of the header separator. A value of 0.25 pixel should be used for hairlines. A value of 0 means that no header separator will be printed.

headerLinePattern — Name of the pattern for the header separator. If a null string is used then no header separator will be printed.

headerLineRed — Header separator RGB red component.

headerLineGreen — Header separator RGB green component.

headerLineBlue — Header separator RGB blue component.

If neither PL_SetFrame nor ***PL_SetRGBFrame*** are called, then no frame or header separator line will be printed.

The following example will set the frame and header separator line using the ***PL_SetRGBFrame*** routine:

```
`Print frame and header separator line in a hairline gray pattern
PL_SetRGBFrame(eNames;0.25;"Gray";209; 209; 209;0.25;"Gray"; 209; 209; 209)
```

# PL_SetHeight

(areaRef:L; numHeaderLines:I; headerHeightPad:I; numRowLines:I; rowHeightPad:I; minimumHeight:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → numHeaderLines | integer | Number of text lines in the header |
| → headerHeightPad | integer | Extra height for the header |
| → numRowLines | integer | Number of text lines in each row |
| → rowHeightPad | integer | Extra height for each row |
| → minimumHeight | integer | Minimum pixel height remaining on the page |

***PL_SetHeight*** is used to set the number of lines of text along with additional height padding in the header and in the rows. Only text and string columns can wrap to more than one line.

If numRowLines is set to 2 or more, text and string elements will be able to wrap into the number of lines specified for each row. Note that all rows will be given the same number of lines regardless of the actual number of lines used by a specific text or string element.

Additional padding may be set using rowHeightPad to allow more space between rows. Text will be centered vertically in the header or row. Note that the padding applies to the entire row and not on a line by line basis within the row.

numHeaderLines — The number of lines in the header. Default is 1.

headerHeightPad — The extra height, in pixels, to give to the header. Default is 2.

numRowLines — The number of lines to give to each row. A value greater than 0 means that the height of each row is the same. The fixed height will either be a function of the number of text lines specified or the height of the largest picture in a picture array if so configured (refer to PL_SetFormat). A value of zero means that the height of each row is to be calculated automatically based on the data that is to be printed. PrintList Pro examines the elements of all text, string, and picture arrays to determine the height of each row. Default is 1.

rowHeightPad — The extra height, in pixels, to give to each row. Default is 0.

minimumHeight — The minimum remaining available height, in pixels, for the PrintList Pro area to print on the page. For example, if there are several PrintList Pro areas on one form, and you want to make sure that at least two rows are printed on one page for the area specified by areaRef, and the row height is 12 points, you can set this parameter to 24. PrintList Pro will test if it has 24 pixels (two rows) left available on the page before printing the area. If not, it will proceed onto the following page. You should specify at least the height of one row in this parameter.

Examples:

```
PL_SetHeight(eList;1;4;1;2) `pad the header by 4 pixels and the rows by 2
PL_SetHeight(eList;2;5;2;0) `set header lines to 2, pad to 5 pixels, set row lines to 2, no padding
PL_SetHeight(eList;1;4;1;2;12) `check that 12 pixels (one row height here) are available before printing
```

## PL_SetSort

(areaRef:L; column1:I; …; columnN:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → column1; …; columnN | integer | Column(s) to perform sort upon |

***PL_SetSort*** is used to perform a multi-level sort.

column — These parameters specify the columns to use for the sort criteria.

- A column greater than 0 causes an ascending sort to be performed upon that column, while a column less than 0 causes a descending sort to be performed upon that column..
- If a column is 0, then all successive columns will be ignored.
- If the arrays are already sorted, use PL_SetBrkOrder instead to communicate the sort order to PrintList Pro.

Examples:

***PL_SetSort***(eNames;3;4;7) `sort on columns 3, 4, and 7 (all ascending)

***PL_SetSort***(eContacts;-1;3;-2) `sort on columns 1 (descending), 3 (ascending), and 2 (descending)

## PL_SetColOpts

(areaRef:L; hideLastColumns:I; hideDetailArea:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → hideLastColumns | integer | Number of columns from the right to hide |
| → hideDetailArea | integer | Hide the list and just show the breaks |

***PL_SetColOpts*** is used to hide columns from being printed and to hide the entire detail area to show just break level information.

hideLastColumns — This parameter specifies the number of arrays from the right to not print. This parameter is useful for keeping many arrays "in sync" when sorting, but only a subset are to be printed. Default is 0.

hideDetailArea — 0 or 1:

**0** — print the array values in the list (default)

**1** — do not print the array values in the list — this is useful for printing a summary of break level information without printing the actual list

Examples:

***PL_SetColOpts*** (eList;2;0) `hide the last two columns

***PL_SetColOpts*** (eList;0;1) `hide the detail area, show only the breaks

## PL_SetCellStyle

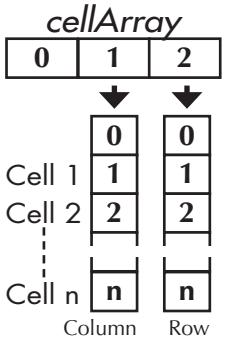
(areaRef:L; firstCellCol:I; firstCellRow:L; lastCellCol:I; lastCellRow:L; cellArray:X; styleNum:I; fontName:S; fontSize:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → firstCellCol | integer | First cell column |
| → firstCellRow | longint | First cell row |
| → lastCellCol | integer | Last cell column |
| → lastCellRow | longint | Last cell row |
| → cellArray | two-dimensional longint array | Discontiguous cells |
| → styleNum | integer | Style of the font |
| → fontName | string | Name of the font |
| → fontSize | integer | Size of the font |

***PL_SetCellStyle*** is used to set the font and/or style of a specific cell, range of cells, or list of cells.

- **To specify a single cell**. If firstCellCol and firstCellRow are greater than 0 and lastCellCol or lastCellRow are less than or equal to 0 then only [firstCellCol, firstCellRow] will be set.
- **To specify a range of cells**. If firstCellCol and firstCellRow are greater than 0 and lastCellCol and lastCellRow are greater than 0 then the range of cells from [firstCellCol, firstCellRow] to [lastCellCol, lastCellRow] will be set.
- **To specify discontiguous cells**. If firstCellCol or firstCellRow are less than or equal to 0 then the cells in cellArray will be set.

cellArray — Two-dimensional long integer array. The first dimension must be two. The first array is for the column indices and the second array is for the row indices. The second dimension must be the same as the number of cells that are to be selected. See the following illustration.



styleNum —This parameter is used to set the style for the specified cells. The values shown below can be added together to combine styles.

| Style | Number |
|---|---|
| Plain | 0 |
| Bold | 1 |
| Italic | 2 |
| Underline | 4 |
| Outline | 8 |
| Shadow | 16 |
| Condensed | 32 |
| Extended | 64 |

If a cell style has been previously set, the style may be removed by setting styleNum to -1. The cell style may be left unchanged by setting styleNum to 256.

fontName — This specifies the font for a cell. The cell font may be left unchanged by setting fontName to the empty string (""). If the specified font is not found, it will be treated as an empty string and ignored.

fontSize — This specifies the font size for a cell. The cell font size may be left unchanged by setting fontSize to 0.

---

***Keep in mind that any settings applied to a cell will be moved with that cell's data if the data is later sorted using PL_SetSort. If you do not want the cell's settings to move, call PL_SetSort before applying the cell settings.***

---

Example:

```
ARRAY LONGINT(aCellSet;2;4)
`Set cell at column 1, row 3 to bold Helvetica - no change in font size
PL_SetCellStyle(eArea;1;3;0;0;aCellSet;1;"Helvetica";0)
`Set cells from column 2, row 2 to column 5, row 5 to font size 14, no change in style and font
PL_SetCellStyle(eArea;2;2;5;5;aCellSet;256;"";14)
`Set the cells in aCellSet to Times
aCellSet{1}{1}:=1  `column 1, row 1
aCellSet{2}{1}:=1
aCellSet{1}{2}:=1  `column 1, row 2
aCellSet{2}{2}:=2
aCellSet{1}{3}:=2  `column 2, row 5
aCellSet{2}{3}:=5
aCellSet{1}{4}:=2  `column 2, row 6
aCellSet{2}{4}:=6
PL_SetCellStyle(eArea;0;0;0;0;aCellSet;256;"Times";0)
```

# PL_SetCellColor

(areaRef:L; firstCellCol:I; firstCellRow:L; lastCellCol:I; lastCellRow:L; cellArray:X; plpForeColor:S; 4dForeColor:I; plpBackColor:S; 4dBackColor:I)

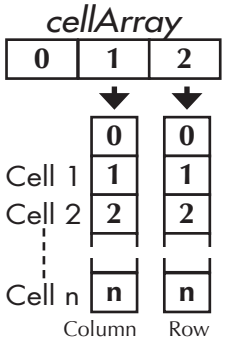
| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → firstCellCol | integer | First cell column |
| → firstCellRow | longint | First cell row |
| → lastCellCol | integer | Last cell column |
| → lastCellRow | longint | Last cell row |
| → cellArray | two-dimensional longint array | Discontiguous cells |
| → plpForeColor | string | Foreground color from PrintList Pro's palette |
| → 4dForeColor | integer | Foreground color from 4D's palette |
| → plpBackColor | string | Background color from PrintList Pro's palette |
| → 4dBackColor | integer | Background color from 4D's palette |

***PL_SetCellColor*** is used to set the foreground color and/or background color of a specific cell, range of cells, or list of cells.

PrintList Pro has its own palette, with the following colors: white, black, blue, green, yellow, magenta, red, cyan, gray, light gray.

- **To specify a single cell**. If firstCellCol and firstCellRow are greater than 0 and lastCellCol or lastCellRow are less than or equal to 0 then only [firstCellCol, firstCellRow] will be set.
- **To specify a range of cells**. If firstCellCol and firstCellRow are greater than 0 and lastCellCol and lastCellRow are greater than 0 then the range of cells from [firstCellCol, firstCellRow] to [lastCellCol, lastCellRow] will be set.
- **To specify discontiguous cells**. If firstCellCol or firstCellRow are less than or equal to 0 then the cells in cellArray will be set.

cellArray — Two-dimensional long integer array. The first dimension must be two. The first array is for the column indices and the second array is for the row indices. The second dimension must be the same as the number of cells that are to be selected. See the following illustration.



plpForeColor — Name of the color in PrintList Pro's palette. This will be the foreground color for the cell. If the name is not in PrintList Pro's palette or it is the empty string (""), then 4dForeColor will be used.

4dForeColor — 1 to 256. Foreground color number for the cell (from 4D's palette). If a cell foreground color has been previously set, it may be removed by setting plpForeColor to the empty string (""), and 4dForeColor to 1. The cell foreground color may be left unchanged by setting plpForeColor to the empty string (""), and 4dForeColor to 0.

plpBackColor — Name of the color in PrintList Pro's palette. This will be the background color for the cell. If the name is not in PrintList Pro's palette or it is the empty string (""), then 4dBackColor will be used.

4dBackColor — 1 to 256. Background color number for the cell (from 4D's palette).
If a cell background color has been previously set, it may be removed by setting plpBackColor to the empty string (""), and 4dBackColor to 1. The cell background color may be left unchanged by setting plpBackColor to the empty string (""), and 4dBackColor to 0.

***Keep in mind that any settings applied to a cell will be moved with that cell's data if the data is later sorted using*** PL_SetSort***. If you do not want the cell's settings to move, call PL_SetSort before applying the cell settings.***

Example:

```
ARRAY LONGINT(aCellArray;2;0) `MUST initialize a two-dimensional long integer array
`Set the foreground color of the cell at column 1, row 3 to blue
PL_SetCellColor (eList;1;3;0;0;aCellArray;"blue";0;"";0)
`Set background color of cells from column 2, row 2 to column 5, row 5 to green
PL_SetCellColor (eList;2;2;5;5;aCellArray;"";0;"Green";0)
`Set all negative values in the third column, a real array, to have a foreground color of red
For($i;1;Size of array(aRevenue)) `check each element in the array
  If(aRevenue{$i}<0) `is the value in this element negative?
    PL_SetCellColor(eList;3;$i;0;0;aCellArray;"Red";0;"";0) `if so, then print it in red
  End if
End for
```

## PL_SetCellRGBColor

(areaRef:L; firstCellCol:I; firstCellRow:L; lastCellCol:I; lastCellRow:L; cellArray:X; cellForeRed:L; cellForeGreen:L; cellForeBlue:L; cellBackRed:L; cellBackGreen:L; cellBackBlue:L)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → firstCellCol | integer | First cell column |
| → firstCellRow | longint | First cell row |
| → lastCellCol | integer | Last cell column |
| → lastCellRow | longint | Last cell row |
| → cellArray | two-dimensional longint array | Discontiguous cells |
| → cellForeRed | longint | Foreground red |
| → cellForeGreen | longint | Foreground green |
| → cellForeBlue | longint | Foreground blue |
| → cellBackRed | longint | Background red |
| → cellBackGreen | longint | Background green |
| → cellBackBlue | longint | Background blue |

***PL_SetCellRGBColor*** is used to set the foreground and/or background color of a specific cell, range of cells, or list of cells. This routine works in the same manner as PL_SetCellColor, except it allows you to specify the colors using standard RGB values.

cellForeRed — Desired foreground red component in RGB color pattern.

cellForeGreen — Desired foreground green component in RGB color pattern.

cellForeBlue — Desired foreground blue component in RGB color pattern.

cellBackRed — Desired background red component in RGB color pattern.

cellBackGreen — Desired background green component in RGB color pattern.

cellBackBlue — Desired background blue component in RGB color pattern.

## PL_SetCellIcon

(areaRef:L; cellColumn:I; cellRow:L; pictRef:P; iconAlignment:I; horPosition:I; vertPosition:I; offset:I; scaling:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → cellColumn | integer | Column at which to set the icon |
| → cellRow | longint | Row at which to set the icon |
| → iconRef | longint | Reference of the icon or picture to use |
| → iconAlignment | integer | Position of icon |
| → horPosition | integer | Horizontal position |
| → vertPosition | integer | Vertical position |
| → offset | integer | Pixel offset |
| → scaling | integer | Scaling |

***PL_SetCellIcon*** provides the ability to procedurally print icons in individual cells.

One or two icons may be used (left and right). You can customize the icon(s) using “cicn” or “PICT” resources, or items from the 4D Picture Library (see details below).

***This call supersedes Escape sentence icons placed in cells (see Header/Cell Icon Support).***

cellColumn — Desired cell column number.

cellRow — Desired cell row number.

iconRef — Reference of the icon or picture to use. Both “cicn” and “PICT” resources can be used, as well as items from the Picture Library. To associate an icon to the cell, pass one of the following numeric values (Use PICT resource and Use PicRef are 4D constants):

- N, where N is the resource ID of Mac OS-based “cicn” resource
- Use PICT resource + N, where N is the the resource ID of a Mac OS-based “PICT” resource
- Use PicRef + N, where N is the reference number of a picture from the Design environment Picture Library
- pass zero (0) if you do not want any icon for the cell

See Header/Cell Icon Support for examples. See also the 4th Dimension Language Reference regarding the **SET LIST ITEM PROPERTIES** command, which uses the same icon syntax.

iconAlignment — Position of icon (each cell can contain up to two icons):

**0** — places icon on left of cell
**1** — places icon on right of cell

horPosition — One the following options:

**0** — default (left for left icon, right for right icon)
**1** — align left
**2** — align center
**3** — align right

vertPosition — One the following options:

**0** — default (top)
**1** — align top left
**2** — align center
**3** — align bottom

offset — offset of the "icon guide". The horizontal position is relative to this position. If the horizontal alignment is center, the icon is centered between the guide and corresponding side of cell (left for left icon, right for right icon).

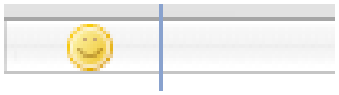
The picture below illustrates the icon guide and its offset:

ICON GUIDE AND OFFSET

In the picture below, the left icon is aligned right to the icon guide and the right icon is aligned left to the icon guide:

LEFT ICON ALIGNED RIGHT
RIGHT ICON ALIGNED LEFT

In the picture below, the left icon is centered between the left border and the icon guide and no right icon is used:



LEFT ICON CENTERED

scaling — One the following options:

**0** — truncated
**1** — scaled

The cell content (text) is printed into the space that is left once the icon is printed. If the icon is larger than the remaining available space, the text is printed over the icon.

For example, if the column width is 100 pixels and you print a 15 pixel icon, there is remaining width of 85 pixels where the text will be printed. If, however, the total width (icon + text) exceeds the column width, the text will be printed over the picture. This allows background pictures behind the text.

The following example will print an icon in r3c2, using an item (resID 1717) from the Picture Library:

```
$col:=2
$row:=3
$iconRef:=1717+Use PicRef
$iconPos:=1 `right
$horPos:=0 `default
$verPos:=2 `align center
$offset:=5
$scaling:=0
PL_SetCellIcon(ePL_Output;$col;$row;$iconRef;$iconPos;$horPos;$verPos;$offset;$scaling)
```

## PL_SetCellBorder

(areaRef:L; cellColumn:I; cellRow:L; borderLeft:I; borderTop:I; borderRight:I; borderBottom:I; offset:I; width:F; redColor:I; greenColor:I; blueColor:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → cellColumn | integer | Column |
| → cellRow | longint | Row |
| → borderLeft | integer | Print left border |
| → borderTop | integer | Print top border |
| → borderRight | integer | Print right border |
| → borderBottom | integer | Print bottom border |
| → offset | integer | Offset from cell boundary in pixels |
| → width | real | Width of line |
| → redColor | integer | Red |
| → greenColor | integer | Green |
| → blueColor | integer | Blue |

***PL_SetCellBorder*** provides the ability to set the border style and RGB color for a cell.

cellColumn — Column of cell where border will be applied.

cellRow — Row of cell where border will be applied.

borderLeft — Print left border.

borderTop — Print top border.

borderRight — Print right border.

borderBottom — Print bottom border.

offset — Offset from cell boundary in pixels. 0 if the border should be printed at cell boundary (default).

width — Width of line. This parameter is a real value, allowing fractional widths. See Hairline Line Width.

redColor — RGB red component used for the border.

greenColor — RGB green component used for the border.

blueColor — RGB blue component used for the border.

## PL_SetCellFrame

(areaRef:L; firstCellCol:I; firstCellRow:L; lastCellCol:I; lastCellRow:L; offset:I; width:F; redLightColor:I; greenLightColor:I; blueLightColor:I; redDarkColor:I; greenDarkColor:I; blueDarkColor:I; clearAllBorders:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → firstCellCol | integer | First cell column |
| → firstCellRow | longint | First cell row |
| → lastCellCol | integer | Last cell column |
| → lastCellRow | longint | Last cell row |
| → offset | integer | Offset from cell boundary in pixels |
| → width | real | Width of line |
| → redLightColor | integer | Red (light color) |
| → greenLightColor | integer | Green (light color) |
| → blueLightColor | integer | Blue (light color) |
| → redDarkColor | integer | Red (dark color) |
| → greenDarkColor | integer | Green (dark color) |
| → blueDarkColor | integer | Blue (dark color) |
| → clearAllBorders | integer | Clear all borders within the frame |

***PL_SetCellFrame*** prints a frame around a range of cells. It uses RGB colors: light color for both left and top lines, dark color for both right and bottom line.

The range of cells from [firstCellCol, firstCellRow] to [lastCellCol, lastCellRow] will be set.

**offset** — Offset from cell boundaries in pixels. 0 if the frame should be printed at cell boundaries (default).

**width** — Width of line. This parameter is a real value, allowing fractional widths. See Hairline Line Width.

**redLightColor, greenLightColor, blueLightColor** — RGB components used for both left and top lines colors.

**redDarkColor, greenDarkColor, blueDarkColor** — RGB components used for both right and bottom lines colors.

**clearAllBorders** — It this parameter value is 1, then all cells inside the frame will have their borders removed.

## PL_SetPageProc

(areaRef:L; callbackMethod:S)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → callbackMethod | string | Name of the page callback project method |

***PL_SetPageProc*** is used to specify a 4D project method to be called at the end of PrintList Pro's processing on every page. Keep in mind that a PrintList Pro page is not necessarily equivalent to a physical page. It is possible to have several occurrences of a PrintList Pro object for a single page. Each occurrence will invoke the callback method at the end of its page.

callbackMethod — The name of the callback method that is called at the end of every PrintList Pro page.

You must use the following declaration in your callback method:

```
C_LONGINT($1;$2)
```

PrintList Pro will pass the method specified by callbackMethod two parameters: the first indicates which PrintList Pro area is calling the method, and the second specifies the last row printed on that page.

Example:

```
PL_SetPageProc(eList;"MyCallback")
```

# Using the Callback Methods

A “callback” is a 4D project method which is executed by a plug-in. PrintList Pro lets you make use of callbacks when printing a PrintList Pro object.

## Summary

PrintList Pro provides four different callback methods:

- when the end of a printed page is reached (**callbackMethod** parameter of PL_SetPageProc)
- custom calculations in a break (**functionName** parameter of PL_SetBrkFunc)
- custom calculations in a break header (**functionName** parameter of PL_SetBkHFunc)
- calculated columns (**calcCallback** parameter of PL_SetCalcCall)

## Warnings

- Callback methods may use most 4D commands, but should not call any PrintList Pro commands or any 4D commands that affect the arrays.
- Callback methods should preserve the current selection of the printing layout’s file by saving and restoring the selection if necessary.
- All callbacks receive parameters, which need to be declared as documented below.

## End of Page Callback

PrintList Pro makes use of a callback method to inform you when the end of a printed page is reached. This enables you to perform any necessary processing associated with the end of the page, for example, changing information printed in the footer area of that page or the header area of the next page.

Use PL_SetPageProc to specify the 4D project method PrintList Pro is to call. PrintList Pro will pass the method specified by **callbackMethod** two parameters: the first indicates which PrintList Pro area is calling the method, and the second specifies the last row printed on that page.

You must use the following declaration in your callback method:

**C_LONGINT**($1;$2)

# Custom Calculations in a Break

PL_SetBrkFunc is used to specify the callback function for use with custom calculations. The callback function functionName is called whenever PrintList Pro encounters the string "\Function" within the text that is to be printed for a specific break level.

Refer to PL_SetBrkText for details on how to embed the custom calculation string.

PrintList Pro passes information needed for the custom calculation to the callback function.

You must use the following declarations in your callback method:

**C_INTEGER** ($1;$2) `break level, column
**C_STRING** (82;$3) `column format
**C_LONGINT**($4;$5) `start row, end row
**C_TEXT** ($0) `custom calculation result to print

# Custom Calculations in a Break Header

A break header will print information just prior to the group of related values.

PL_SetBkHFunc is used to specify the name of the break header callback function. This function will be called for any break header that contains a break function. Refer to PL_SetBrkText and PL_SetBkHText to determine how to set a break function for a break level. The syntax of this command is identical to that of PL_SetBrkFunc.

The callback function functionName is called whenever PrintList Pro encounters the string "\Function" within the text that is to be printed for a specific break level. PrintList Pro passes information needed for the custom calculation to the callback function.

You must use the following declarations in your callback method:

**C_INTEGER** ($1;$2) `break level, column
**C_STRING** (82;$3) `column format
**C_LONGINT**($4;$5) `start row, end row
**C_TEXT** ($0) `custom calculation result to print

# Calculated Column Callback

A 4D callback may be attached to a specific column. When information is needed for this column, PrintList Pro will execute the callback to allow you to fill the column with data. This allows the printing of data calculated from one or more fields as well as any ad hoc data that is desired.

| Parameter | Description |
|---|---|
| $1 | Reference of PrintList Pro object on layout |
| $2 | Column number |
| $3 | Type of data in this column |
| $4 | Pointer to temporary 4D array |
| $5 | First record for which to calculate cell |
| $6 | Number of cells to calculate in column |

The first three parameters are not absolutely necessary to determine how to fill the column. They are provided to give you more flexibility in the implementation of the callback method.

- The first parameter is the areaRef. This gives you the ability to use this callback method for more than one PrintList Pro object.
- The second parameter is the column number. This gives you the ability to use this callback method for many columns within a PrintList Pro object.
- The third parameter is the type of data in the column.

The last three parameters are absolutely necessary.

- The fourth parameter is a pointer to one of the temporary 4D arrays declared in the *Compiler_PLP* method. This is where you will load the data to be printed in the column.
- The fifth parameter is the number of the first cell that needs to be filled in the column. This is the same as the selected number of the row that contains this cell.
- The sixth parameter is the number of cells to be filled in the column.

***You must declare all six parameters ($1 to $6) in the calculated column callback. If any of these parameters are not declared, you will get an error when compiling the database.***

You must use the following declarations in your callback method:

**C_LONGINT**($1;$2;$3;$5;$6)
**C_POINTER**($4)

See Setting a Calculated Column for details.

# Field and Record Commands

PrintList Pro uses the **SELECTION RANGE TO ARRAY** command in 4D to get the records for printing.

Up to 512 fields (columns) can be printed in a PrintList Pro object.

## Using the Field Printing Capability

### Temporary Arrays

PrintList Pro internally uses interprocess 4D arrays to get the record data from 4th Dimension. These arrays must be declared in 4D. A text file has been included that contains these declarations. Simply create a 4D global method named *Compiler_PLP* and copy these declarations into it. There is no need to call this method from your 4D code, PrintList Pro will call it for you. This method must exist whether your database is interpreted or compiled.

Do not access the data within these temporary arrays. These arrays are for PrintList Pro's internal use only and their contents may change at any time.

Only 30 arrays of each of the 9 data types that PrintList Pro supports are declared. If you will be printing more than 30 fields of a certain type, then you must add more declarations within the *Compiler_PLP* project method.

Conversely, you may remove some of these declarations if you never print fields (or print very few fields) of a certain type. Be very careful (when adding or removing declarations) to follow exactly the syntax of the existing declarations.

### Arrays and Fields

***Arrays and fields may not be printed together in the same PrintList Pro object. If arrays are printed in an object, then the field commands will be ignored. Conversely, if fields are printed in an object, then the array commands will be ignored.***

## Setting a Calculated Column

The PL_SetFields command is used both to set fields to be printed and to set up calculated columns.

If the fieldNum parameter contains an integer greater than or equal to 1, the column wil print the field represented by that number.

If the fieldNum parameter contains an integer less than or equal to 0, the column will print calculated data. The absolute value of fieldNum will determine the type of data to be printed in the column.

The following table shows the data types that may be printed in a calculated column.

| Constant | Value |
|---|---|
| Is Alpha Field | 0 |
| Is Real | 1 |
| Is Text | 2 |
| Is Picture | 3 |
| Is Date | 4 |
| Is Boolean | 6 |
| Is Integer | 8 |
| Is LongInt | 9 |
| Is Time | 11 |

For example, to print a calculated solumn of type Real, pass Is Real (-1) in the fieldNum parameter.

## Setting the Callback Method

Use the PL_SetCalcCall command to set the callback method for a column.

***PrintList Pro will dimension the temporary array before invoking the calculated column callback. There is no need to do it in the callback itself.***

The following is an example of a calculated callback method. It merely calculates an employee's one year anniversary by adding 365 to their hire date (this obviously does not take into account leap years, but is sufficient as an example).

```
`CalcColCallback
`$1: Area reference (PrintList Pro longint reference)
`$2: Column number
`$3: Type of data in this column
`$4: Pointer to temporary 4D array
`$5: First record for which to calculate cell
`$6: Number of cells to calculate in column
`Declare the parameters
C_LONGINT($1;$2;$3;$5;$6) `these must be declared
C_POINTER($4) `this must be declared
C_LONGINT($i)
ARRAY DATE($aHireDate;0)
SELECTION RANGE TO ARRAY($5;$5+$6-1;[Employee]Hire Date;$aHireDate)
For($i;1;$6)
  $4->{$i}:=$aHireDate{$i}+365
End for
```

## Time Data

Time data will be converted to a longint since this is how it is stored internally by 4D.

# Printing 4D Fields

## Fields from Related One Tables

Fields from a main table and from related one tables may be printed in the same PrintList Pro object. See the commands PL_SetFile and PL_SetFields for further information about printing fields from related one tables.

## Sorting

PrintList Pro uses 4th Dimension's sorting routines when sorting fields. 4D only uses indexes when performing a single level sort. Indexes are ignored when performing a multiple level sort.

When printing records, fields from a related one table can be included in a sort.

## Maximum Number of Records Printed

PrintList Pro supports a maximum of 2 billion (exactly 2 147 483 647) records printed in a PrintList Pro object.

You can also print a selection with any desired number of records up to this limit, using PL_SetSubSelect to specify what record range within the current selection you wish to print.

## Using Break Level Calculations With Fields

The Sum, Average, Min and Max calculations will not work in a break header. Only BreakValue (retrieve the current row's data) and BreakFunc will work in a break header. Remember, when printing using fields, no array information is available. 4D records may be accessed from the current selection. Be sure that you don't change the current selection.

## Performance Issues When Printing Fields

When PrintList Pro prints fields, the automatic column sizing algorithm uses only the first 20 records (or less, if the selection contains less than 20 records) in the selection. These records are always read regardless of whether the columns are automatically or manually sized.

Therefore there is no performance penalty using the automatic column sizing algorithm when printing fields. See Performance Issues with Formatting Commands for more information.

# Commands

## PL_SetFile

(areaRef:L; tableNum:I) → resultCode:L

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → tableNum | integer | Number of 4D table |
| ← resultCode | longint | Result code |

***PL_SetFile*** tells PrintList Pro what table is the main table from which to print records.

This command is only necessary if the field to be printed in column one is not from the main table, but from a related one table.

***PL_SetFile*** must be called before any fields have been set, otherwise it will be ignored. If this command is not called, then PrintList Pro will use the table of the field printed in column one as the main table.

resultCode — The possible values are:

| Constant | Value | Action |
|---|---|---|
| PL SetFile Passed | 0 | |
| PL Not enough memory | 5 | Increase 4D's RAM partition |
| PL Not a file | 6 | Check to make sure that the table represented by tableNum does exist |
| PL Wrong 4D version | 10 | (obsolete) |
| PL Arrays have been set | 11 | You've attempted to set fields or a table when arrays have already been set |
| PL Fields have been set | 12 | You've attempted to set arrays when fields have already been set |

Example:

```
$result:=PL_SetFile(eList;Table(->[People]))
```

## PL_SetFields

(areaRef:L; tableNum:I; columnNumber:I; numFields:I; fieldNum1; …; fieldNumN:I)
→ resultCode:L

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → tableNum | integer | Number of 4D table |
| → columnNumber | integer | Column at which to set the first field |
| → numFields | integer | Number of fields to set (up to 15) |
| → fieldNum | integer | Number of 4D field |
| ← resultCode | longint | Result code |

***PL_SetFields*** tells PrintList Pro what fields to print. Up to fifteen fields can be set at a time. Any 4D field type can be used except sub-tables.

Fields from related one tables may also be printed (see PL_SetFile). A separate call to ***PL_SetFields*** must be made to set these fields. To print a related one field, pass the table number of the related one table in the tableNum parameter.

resultCode — The possible values are:

| Constant | Value | Action |
|---|---|---|
| PL SetFields Passed | 0 | |
| PL Not enough memory | 5 | Increase 4D's RAM partition |
| PL Not a file | 6 | Check to make sure that the table represented by tableNum does exist |
| PL Not a field | 7 | The fieldNum passed is not a valid 4D field number |
| PL Wrong field type | 8 | The field passed cannot be used by PrintList because the field's type is not supported |
| PL Maximum fields exceeded | 9 | 512 fields is the maximum |
| PL Wrong 4D version | 10 | (obsolete) |
| PL Arrays have been set | 11 | You've attempted to set fields or a table when arrays have already been set |

Examples:

```
`Set up the eList PrintList Pro object with 5 fields, all from the same table
$error:=PL_SetFields(eList;Table(->[People]);1;5;Field(->[People]First Name);
  Field(->[People]Last Name);Field(->[People]Salary);Field(->[People]Arrival);Field(->[People]Male))
```

```
`Set up the eList PrintList Pro object with 4 fields, the third one from a related table
$error:=PL_SetFields(eList;Table(->[People]);1;2;Field(->[People]First Name);
  Field(->[People]Last Name))
$error:=PL_SetFields(eList;Table(->[Companies]);3;1;Field(->[Companies]Company Name))
$error: PL_SetFields(eList;Table(->[People]);4;1;Field(->[People]Salary))

`Set up the eList PrintList Pro object with 4 fields, the first one from a related table
$error:=PL_SetFile(eList;Table(->[People])) `set the main table since the field to be set in column one is
  not from the main table, but from a related one table
$error:=PL_SetFields(eList;Table(->[Companies]);1;1;Field(->[Companies]Company Name))
$error:=PL_SetFields(eList;Table(->[People]);2;3;Field(->[People]First Name);
  Field(->[People]Last Name); Field(->[People]Salary))
```

## PL_SetCalcCall

(areaRef:L; columnNumber:I; calcCallback:S)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → columnNumber | integer | Column number |
| → calcCallback | string | 4D method called ot fill row(s) of a calculated column |

***PL_SetCalcCall*** is used to set a callback method for a calculated column.

columnNumber — This parameter specifies the column on which to attach the calcCallback method.

calcCallback — This method will be called whenever row(s) need to be filled in a calculated column. If this is an empty string then no method will be called.

The first two parameters ($1 and $2) passed to this callback method are areaRef and columnNumber. Therefore, if desired, the same callback can be used for more than one PrintList Pro object and for many columns in an object.

For information on how to write a calculated column callback, see the section Calculated Column Callback.

Example:

```
`Set calculated callback method for column 3
PL_SetCalcCall(eArea;3;"CalcColCallback")
```

# PL_SetSubSelect

(areaRef:L; firstRecord:L; numRecords:L)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → firstRecord | longint | First record to print |
| → numRecords | longint | Number of records to print |

***PL_SetSubSelect*** is used to tell PrintList Pro to print a different subselection of records from the current selection.

firstRecord — This parameter is used to set the first record in the selection to be printed in the PrintList Pro object. If firstRecord is greater than or equal to the number of records in the selection, then it will be set to the last record in the selection. The default is 1.

numRecords — This parameter is used to set the number of records in the selection to be printed in the PrintList Pro object. The possible values are:

| Value | Description |
|---|---|
| >= 0 | Print this number of records |
| -1 | Print the number of records from firstRecord until the end of the selection |

If numRecords is greater than the number of records from firstRecord until the end of the selection, then numRecords will be set to the number of records from firstRecord until the end of the selection.

If this command is not called, then firstRecord will be set to 1 and numRecords will be set to the number of records in the selection.

Example:

```
`Set up the eList PrintList Pro object to print 10,000 records beginning at record 5001
PL_SetSubSelect(eList;5001;10000)
```

# Break Level Processing

## About PrintList Pro Break Level Processing

The PrintList Pro break level processing routines provide the functionality of 4D's Quick Report capabilities, and much more. You can choose to display a variety of information for any break level and any column within that break including: static text, Quick Report calculations, custom calculations or break data insertion for each break.

Each piece of information can be shown in different fonts, sizes and styles as well as different colors. You can also control the display of repeated values.

## When Do Breaks Occur?

When a list is sorted, often some of the sorted array elements will have groups of identical values.

For example, if the membership of a club that consisted of members from many different countries was sorted by country, the membership list would likely consist of many members that were from the same country. Because the list is sorted, all the members from the same country would be grouped together in the list. A "break" would occur in the list anytime the group changes (the country is different).

Multiple break levels occur when the list is sorted on multiple criteria. The number of any break level is determined by its position in the sort order. If the same membership list is sorted by country first and then by city, a break for break level one (country) would occur whenever the country changes in the list, and a break for break level two (city) would occur whenever the city changes in the list.

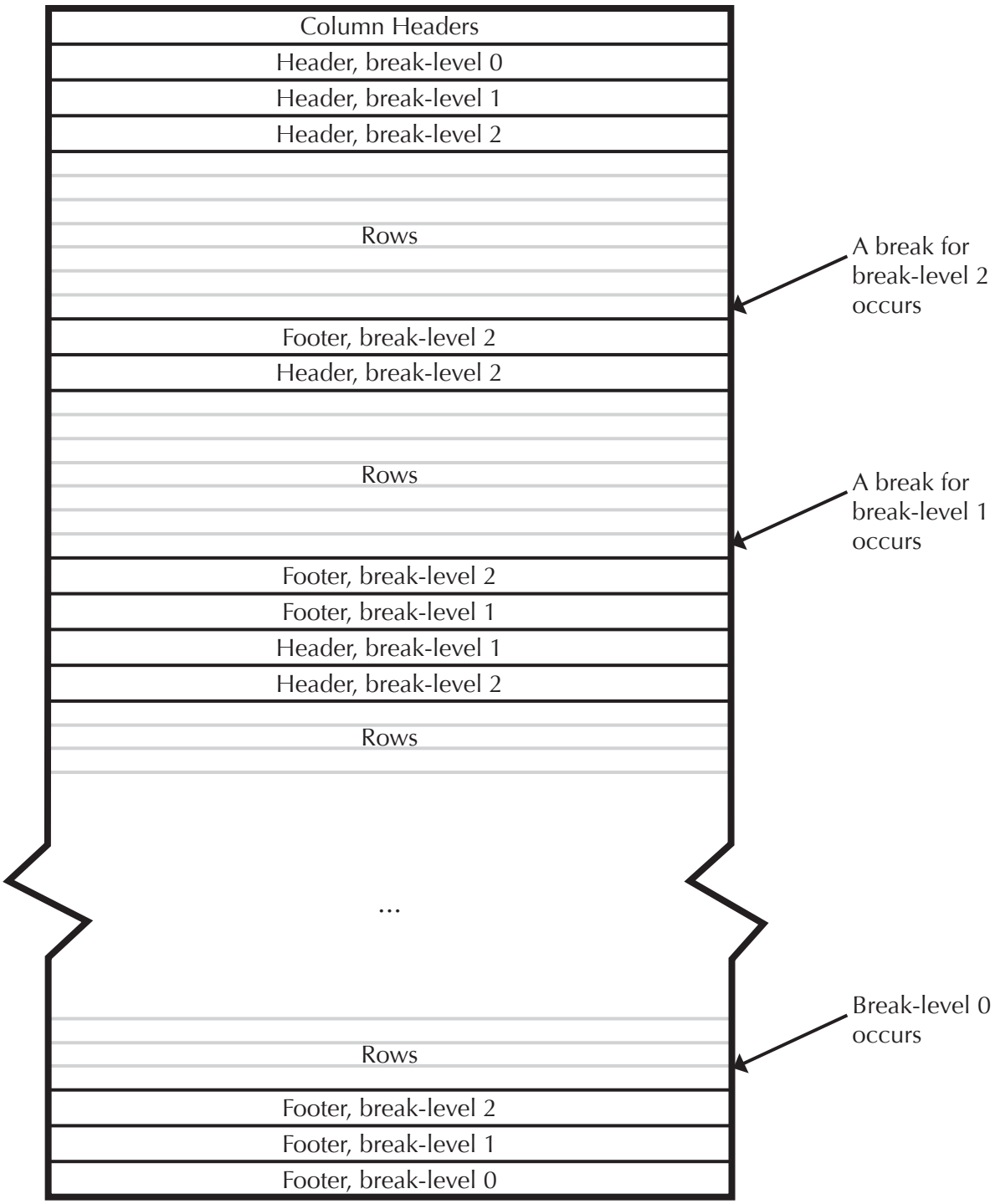
When a break occurs for a certain level, every break level higher than it will occur as well. In the club example, break level 2 (city) will always break whenever a break for break level 1 (country) occurs.

You may want to show leading or summary information for the groups of information within the list. In PrintList Pro, these areas are called break headers and break footers respectively.

A break header will print information just prior to the group of related values while a break footer will print information immediately after the group.

## Break Level Processing

The following is an illustration of the location of break headers and footers within a list:



# Using PrintList Pro Break Level Processing

Any break level routine that accepts a column number requires that the column/array be set using PL_SetArraysNam prior to calling that routine.

PrintList Pro provides up to 15 break levels and a total line at the end of list. For any given list, the number of break levels can be no greater than the number of sorted arrays.

PrintList Pro will only print a break for a break level that has been configured using PL_SetBrkText for break footers or PL_SetBkHText for break headers.

A break level can be configured regardless if lower breaks have been configured. This is different than 4D's Quick Report Editor that requires the users to "stack" break levels upon lower (closer to 0) break levels and hide the break levels that are not desired.

With PrintList Pro, a break level can be configured regardless if lower breaks have been configured; therefore, there is no need to "hide" a break. In the people example, information can be shown for a group of people in the same city without necessarily showing any information for the state.

In conjunction with ***PL_SetArraysNam*** , PrintList Pro uses the information in PL_SetSort to determine where the breaks occur within the arrays. If the arrays passed to PrintList Pro are pre-sorted, PL_SetBrkOrder should be used to notify PrintList Pro of the sort order without forcing an unnecessary sort.

The break level parameter used in many break level routines is the position of a particular column within the sort order given. For example, if a list of people were to be sorted by state, county, and city respectively, the calls to set and sort the arrays would be:

***PL_SetArraysNam*** (eList;1;4;aPeople;aCity;aCounty;aState)

***PL_SetSort*** (eList;4;3;2)

Break level 1 is state (column 4), break level 2 is county (column 3), and break level 3 is city (column 2).

The following commands are used to configure breaks: PL_SetBrkColOpt, PL_SetBrkColor, PL_SetBrkRGBColor, PL_SetBrkFunc, PL_SetBrkHeight, PL_SetBrkStyle, PL_SetBrkText.

The following commands are used to configure break headers: PL_SetBkHColOpt, PL_SetBkHColor, PL_SetBkHRGBColor, PL_SetBkHFunc, PL_SetBkHHeight, PL_SetBkHStyle, PL_SetBkHText.

PL_SetBrkRowDiv is not specifically a break footer or header routine. This command specifies the line that is drawn between a break footer and the following break header or group of rows.

# Setting a Break Level

To show information for a break level, you will need to use PL_SetBrkText for break footers and PL_SetBkHText for break headers.

A text variable containing the information to be printed is passed in for a particular cell within the break. Because a break can consist of more than one text line, the supplied text may wrap into several lines. See Multiple Lines in a Break and Variable Height Breaks for more information.

Carriage returns may be embedded into the text to force wrapping.

# Text Overflow and Justification in Breaks

Unlike a Quick Report, information to be printed in a cell can overflow into adjacent columns depending on the justification.

As specified in the call to ***PL_SetBrkText*** or ***PL_SetBkHText*** , the area used to print the text is taken from the column specified and adjacent columns to the right for left justification, columns to the left for right justification, and columns on both sides for center justification.

# Built-in Calculations in a Break

Calculations may be embedded into the text passed to ***PL_SetBrkText*** or ***PL_SetBkHText***.

Built-in functions — sum, average, minimum, maximum, count and break value — can be inserted into the text at any desired location. These are identical to 4D's QuickReport calculations except for break value which inserts the value from the array that caused the break.

# Custom Calculations in a Break

You may create custom calculations to be used with or instead of the built-in calculations.

When PrintList Pro sees the custom calculation delimiter, it will execute a callback method, specified using PL_SetBrkFunc for break footers and PL_SetBkHFunc for break headers, that performs the custom calculation.

The callback method may use most 4D commands, but should not call any PrintList Pro commands or any 4D commands that affect the arrays.

Also, the callback method should preserve the current selection of the printing layout's file by saving and restoring the selection if necessary. The value returned by the callback method will then be printed at the embedded position within the break text.

# Suppressing Repeated Values in the List

Repeated values in a sorted list can be suppressed using PL_SetRepeatVal. The repeated value is shown on the first occurrence and at the top of each page thereafter.

***PL_SetRepeatVal*** works on any sorted list regardless of whether any break level information is shown or not.

# Style and Color in Breaks

Style and color settings can be provided for each column within each break level using:

- PL_SetBrkColor for break footers and PL_SetBkHColor for break headers to set foreground and background colors using PrintList Pro's palette or 4D's palette.
- PL_SetBrkRGBColor for break footers and PL_SetBkHRGBColor for break headers to set foreground and background colors using standard RGB values.
- PL_SetBrkStyle for break footers and PL_SetBkHStyle for break headers to set text style settings

If no style or color information is given, PrintList Pro will use the corresponding column settings from the list.

# Multiple Lines in a Break

Both break headers and footers can be configured to be a fixed number of lines per break or a variable number of lines.

To set the number of lines to be printed in a break level, use PL_SetBrkHeight for break footers and PL_SetBkHHeight for break headers.

Please read the section Variable Height Breaks for more information.

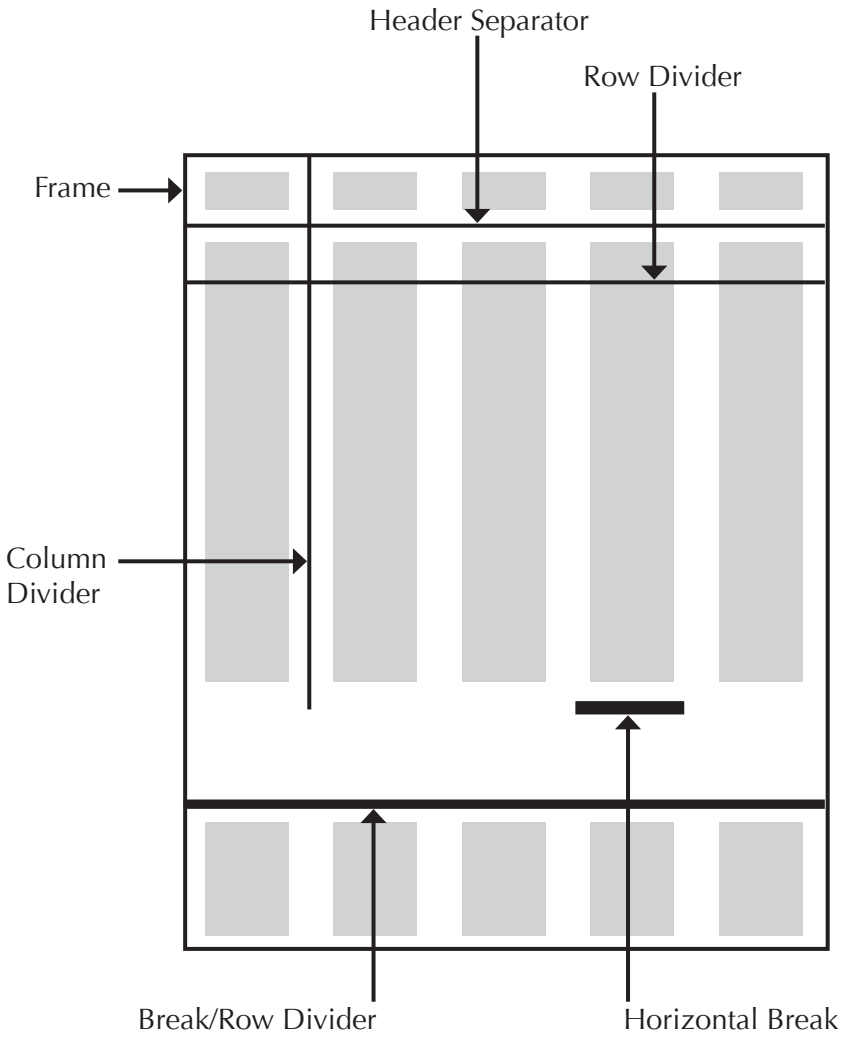
---

***If no calls to PL_SetBrkText are made for a specific break level, nothing will be displayed for any break occurring for that level regardless of the number of lines or height pad specified in PL_SetBrkHeight.***

---

# Lines Displayed in a Break

PrintList Pro provides complete control over all the lines printed in a break as shown in the following illustration:




Whenever a break or group of breaks is printed, the line following the last break, referred to as the Break/Row Divider, can be configured using PL_SetBrkRowDiv. If the Break/Row divider is not set, the row divider (if set) will be printed by default.

If column dividers have been set using PL_SetDividers or PL_SetRGBDividers, they can be printed in the break using PL_SetBrkColOpt for break footers and PL_SetBkHColOpt for break headers.

If set, the column divider will be printed in the break area to the right of each column within the break level.

A horizontal line, referred to in the illustration on the previous page as the Horizontal Break line, may be printed within the break areas as well.

- for break footers, use ***PL_SetBrkColOpt*** to print a line at the top of the cell within the break footer area
- for break headers, use ***PL_SetBkHColOpt*** to print a line at the bottom of the cell within the break header area

# Hide the Detail Area

The detail area (the list of array data) can be hidden to show only the break level information on the page using PL_SetColOpts. This is ideal for giving a summary of the array information.

# Page Breaks

PL_SetPageBreak tells PrintList Pro whether or not to force a page break on any given break level.

The page break will occur immediately after the break footer is printed for that break level. However, a page break can be set for a break level regardless of whether a break level is configured to print a break footer.

PL_SetBrkOpts can be called with the parameter printLastPageBreak to print or suppress a a page break if it occurs on the last page. This option is used to avoid the printing of an unneeded blank page at the end of a PrintList Pro report.

# Variable Height Breaks

Any given break level can be set to be a variable height. The same rules apply to breaks as to the rows in that a break can be of no height or up to the height of an entire page.

When a break level is set to be variable height, PrintList Pro will perform the necessary break level calculation(s) to determine the height of the text that is to be printed in the break.

To set a break level to be variable height use PL_SetBrkHeight for break footers and PL_SetBkHHeight for break headers.

# Using Break Headers

The ability to configure break headers is identical to that of break footers including:

- all calculations: sum, average, min, max, count, and break value
- a callback for the break function (one callback for all break headers)
- full style (font, size, style) control for each cell within the break
- horizontal and vertical line/divider control
- foreground and background colors for each cell within the break
- variable height breaks

Break headers can be configured using six commands: PL_SetBkHText, PL_SetBkHFunc, PL_SetBkHStyle, PL_SetBkHColor, PL_SetBkHHeight, and PL_SetBkHColOpt. These commands are identical in syntax to the break footer commands.

PL_SetBrkColOpt can be called to print horizontal lines at the top of a cell with a break footer. With break headers, the equivalent command ***PL_SetBkHColOpt*** will print lines at the bottom of a cell within the break header.

Just as with break footers, break headers will only be printed if the command to set the break text, ***PL_SetBkHText***, has been called for a particular break level.

Break headers can be configured to be fixed or variable height and have full background color control as is now available with break footers.

# Using Break Levels When Printing Records

A few limitations are present when printing records using PrintList Pro.

Please read the section Using Break Level Calculations With Fields for more information.

# Commands

## PL_SetPageBreak

(areaRef:L; breakLevel:I; insertPageBreak:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → breakLevel | integer | Break level number |
| → insertPageBreak | integer | Insert a page break after the break level |

***PL_SetPageBreak*** is used to set a page break after each break at the specified break level.

A page break can be inserted provided the rows are sorted. However, it is not necessary to configure a break level using PL_SetBrkText or PL_SetBkHText in order to insert a page break.

For the specified break level, the break header, the rows, and the break footer will print (if so configured) prior to the page break. Any subsequent break footers or rows will be printed at the top of the following page.

breakLevel — The position in the sort order specified in PL_SetSort or PL_SetBrkOrder i.e. 1 through n, where n is the number of levels of sort.

insertPageBreak — 0 or 1:

**0** — no page break will be inserted (default)

**1** — a page break will be inserted after each break at the specified break level

Refer to PL_SetBrkOpts to see how to print or suppress a page break on the last page of a PrintList report.

Example:

```
PL_SetPageBreak(eList;1;1) `force a page break after printing each break of break level 1
```

## PL_SetBrkOpts

(areaRef:L; printLastPageBreak:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → printLastPageBreak | integer | Print a page break on the last page |

***PL_SetBrkOpts*** is used to set options pertaining to break levels.

printLastPageBreak — 0 or 1:

**0** — the page break will be suppressed (default)
**1** — if there is a page break on the last page, it will be printed

Refer to PL_SetPageBreak for configuring page breaks.

Example:

```
PL_SetBrkOpts(eList;0) `don't print the last page break
```

## PL_SetBrkOrder

(areaRef:L; columnNum1:I; …; columnNumN:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → columnNum1; …; columnNumN | integer | Column(s) that reflects the sort order |

***PL_SetBrkOrder*** is used to communicate the sort order of a previously sorted list to PrintList Pro. The sort information is used by PrintList Pro to determine where breaks occur within the sorted list.

The syntax of this call is identical to that of PL_SetSort.

columnNum — A value greater than 0 indicates that an ascending sort was performed upon that column, while a value less than 0 indicates that a descending sort was performed upon that column. If a columnNum is 0 then all successive columns will be ignored.

***PL_SetBrkOrder does not perform a sort.***

Examples:

```
PL_SetBrkOrder(eContacts;3;4;7) `was sorted on columns 3, 4, and 7 (all ascending)
PL_SetBrkOrder(eContacts;-1;3;-2) `was sorted on columns 1 descending, 3 ascending, 2 descending
```

## PL_SetRepeatVal

(areaRef:L; columnNum:I; repeatValues:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → columnNum | integer | Column number |
| → repeatValues | integer | Hide/print repeated values for this column |

***PL_SetRepeatVal*** is used to control the printing of repeated values within a sorted column.

Use PL_SetSort to sort the arrays or if already sorted, use PL_SetBrkOrder to communicate the sorted order to PrintList Pro.

columnNum — The column number to apply this command to. Use a value of zero (0) for columnNum to apply the repeat value to all columns in the list.

repeatValues — 0 or 1:

- **0** — only print the first occurence of a repeated value after reaching a break and at the top of each page thereafter
- **1** — print all repeated values (default)

Examples:

```
PL_SetRepeatVal(eList;3;0) `show repeat values for column 3
PL_SetRepeatVal(eList;0;1) `hide repeat values for all columns
```

## PL_SetBrkText

(areaRef:L; breakLevel:I; columnNum:I; breakText:T; numColsToOverflow:I; justification:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → breakLevel | integer | Break level number |
| → columnNum | integer | Column number |
| → breakText | integer | Text to be printed when a break occurs |
| → numColsToOverflow | integer | Number of adjacent columns to overflow into |
| → justification | integer | Justification of the break text |

***PL_SetBrkText*** is used to specify the text, passed in as breakText, to be printed in the breakLevel and columnNum specified.

## Break Level Processing

Calculations can be performed upon the corresponding values in the list. A calculation is performed by embedding a special calculation string(s) into breakText as described below.

Text can overflow to adjacent columns using the numColsToOverflow parameter. The text is justified within a column(s) using the justification parameter.

If no call to ***PL_SetBrkText*** is made for breakLevel, no break information will be printed for that break level.

breakLevel — The position in the sort order specified in PL_SetSort or PL_SetBrkOrder — i.e., 1 through n, where n is the number of levels of sort. Use a value of 0 to specify the total line to be printed at the end of the list.

columnNum — The column number at which the specified text will be placed for the specified breakLevel.

breakText — The text to be shown in columnNum whenever a break occurs for breakLevel. The text may automatically wrap to multiple lines or carriage returns can be embedded to force text wrapping. Use PL_SetBrkHeight or PL_SetBkHHeight to set the number of text lines for a break level if more than 1 line is anticipated.

A calculation may be performed on all the values in columnNum since the last break for breakLevel.

breakText can include embedded calculation strings which inform PrintList Pro to perform the desired calculation using the array values associated with columnNum. The result of the calculation is formatted into a string which replaces the calculation string at its location within breakText. The following table shows a list of the calculations and the associated strings (not case-sensitive) that can be included in breakText:

| Calculation | Calculation String |
|---|---|
| Sum | "\Sum" |
| Average | "\Average" |
| Minimum | "\Minimum" |
| Maximum | "\Maximum" |
| Count | "\Count" |
| Break Value Insertion | "\BreakValue" |
| Custom Calculation | "\Function" |

Sum, Average, Minimum, Maximum, and Count are identical to that of 4D's QuickReport editor.

Break Value Insertion will use the array value from the sorted column that is associated with breakLevel for insertion into breakText.

Custom Calculation will execute the callback function specified in PL_SetBrkFunc or PL_SetBkHFunc to retrieve a string for insertion into breakText. See ***PL_SetBrkFunc*** and ***PL_SetBkHFunc*** for details of performing custom calculations using the callback function.

Not all calculations are available on all array types. The following table lists the calculations possible for the various array data types and the resulting type of the calculation:

| Column Data Type | Calculation | Data Type of Result |
|---|---|---|
| numeric | Sum | same as column |
| numeric | Average | real |
| numeric | Minimum | same as column |
| numeric | Maximum | same as column |
| all | Count | integer |
| all | Break Value Insertion | same as break column |
| all | Custom Calculation | formatted text |

When the resulting value's data type is the same as the columnNum data type, the value is formatted using the column's format. Otherwise, the calculations' results will use PrintList Pro's real and integer default formats where appropriate. The result of the custom calculation is formatted by the callback function which returns text.

numColsToOverflow — Number of adjacent columns to use when overflowing to the right (when left justified), or left (when right justified), or both (when center justified) of columnNum. A value of zero, which is the default, indicates that breakText will only be printed within the column.

justification — The justification of breakText within the column (or columns if numColsToOverflow is greater than 0):

**0** — default (justification of columnNum in the list detail area will be used)
**1** — left
**2** — center
**3** — right

Examples:

```
`Break level 1, column 3, overflow 2 columns to the right, left-justified
PL_SetBrkText(eList;1;3;"Company Subtotals";2;1)

`Break level 3, column 6, no column overflow, use default justification
PL_SetBrkText(eList;3;6;"\Sum";0;0)

`Break level 4, column 3, overflow into 1 column on both sides of this column, center-justified
PL_SetBrkText(eList;4;3;"There are \Count people in this department.";1;2)
```

## PL_SetBkHText

(areaRef:L; breakLevel:I; columnNum:I; breakText:T; numColsToOverflow:I; justification:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → breakLevel | integer | Break level number |
| → columnNum | integer | Column number |
| → breakText | integer | Text to be printed when a break occurs |
| → numColsToOverflow | integer | Number of adjacent columns to overflow into |
| → justification | integer | Justification of the break text |

***PL_SetBkHText*** is used to specify the text that is to be printed in the break header. The syntax of this command is identical to that of PL_SetBrkText.

## PL_SetBrkFunc

(areaRef:L; functionName:S)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → functionName | string | Function name to be called back |

***PL_SetBrkFunc*** is used to specify the callback function for use with custom calculations. The callback function functionName is called whenever PrintList Pro encounters the string "\Function" within the text that is to be printed for a specific break level.

Refer to PL_SetBrkText for details on how to embed the custom calculation string.

PrintList Pro passes information needed for the custom calculation to the callback function.

The callback function should be created using the following interface:

```
`Function: MyBreakFunction (breakLevel; column; colFormat; startRow; endRow)
C_INTEGER ($1;$2) `break level, column
C_STRING (82;$3) `column format
C_LONGINT ($4;$5) `start row, end row
C_TEXT ($0) `custom calculation result to print
`... perform the custom calculation
$0:=String (customCalc;$3) `format the string using the column format
```

The callback function is passed the break level number for which the break has occurred, the column number, the format of that column, and the starting and ending indexes of the corresponding array.

The function should return, as formatted text, the result of the calculation. The return variable, $0, should be of type text and should be 255 characters or less.

Example:

```
PL_SetBrkFunc(eList;"Break Function") `custom calculation callback
```

See Example 4 — Break Level Processing for an example of a custom calculation callback function.

## PL_SetBkHFunc

(areaRef:L; functionName:S)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → functionName | string | Function name to be called back |

***PL_SetBkHFunc*** is used to specify the name of the break header callback function. This function will be called for any break header that contains a break function.

Refer to PL_SetBrkText and PL_SetBkHText to determine how to set a break function for a break level.

The syntax of this command is identical to that of PL_SetBrkFunc.

## PL_SetBrkStyle

(areaRef:L; breakLevel:I; columnNum:I; fontName:S; size:I; styleNum:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → breakLevel | integer | Break level number |
| → columnNum | integer | Column number |
| → fontName | string | Name of the font |
| → size | integer | Size of the font |
| → styleNum | integer | Style of the font |

***PL_SetBrkStyle*** is used to control the appearance of the break level text for the breakLevel and columnNum specified. The columns can be controlled individually or as a group.

breakLevel — This parameter specifies the break level to apply this command to.

columnNum — The column to apply this command to. Use a value of zero (0) for columnNum to apply the parameters to all columns within that break level.

fontName — This specifies the font for the break. The break font may be left unchanged by setting fontName to the empty string (""). If the font specified is not found, it will be treated as an empty string and ignored.

fontSize — This specifies the font size for the break. The break font size may be left unchanged by setting fontSize to 0.

styleNum — This parameter is a font style code. By adding the codes together, you can combine styles. The numeric codes for styleNum are shown below.

| Style | Number |
|---|---|
| Plain | 0 |
| Bold | 1 |
| Italic | 2 |
| Underline | 4 |
| Outline | 8 |
| Shadow | 16 |
| Condensed | 32 |
| Extended | 64 |

## PL_SetBkHStyle

(areaRef:L; breakLevel:I; columnNum:I; fontName:S; size:I; styleNum:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → breakLevel | integer | Break level number |
| → columnNum | integer | Column number |
| → fontName | string | Name of the font |
| → size | integer | Size of the font |
| → styleNum | integer | Style of the font |

***PL_SetBkHStyle*** is used to set the style of the text that is to be printed in the break header. The syntax of this command is identical to that of PL_SetBrkStyle.

## PL_SetBrkColor

(areaRef:L; breakLevel:I; columnNum:I; plpForeColor:S; 4dForeColor:I; plpBackColor:S; 4dBackColor:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → breakLevel | integer | Break level number |
| → columnNum | integer | Column number |
| → plpForeColor | string | Foreground color from PrintList Pro's palette |
| → 4dForeColor | integer | Foreground color from 4D's palette |
| → plpBackColor | string | Background color from PrintList Pro's palette |
| → 4dBackColor | integer | Background color from 4D's palette |

***PL_SetBrkColor*** is used to specify the color of the text to be printed in the specified columnNum and breakLevel.

PrintList Pro has its own palette, with the following colors: white, black, blue, green, yellow, magenta, red, cyan, gray, light gray.

breakLevel — This parameter specifies the break level to apply this command to.

columnNum — The column to apply this command to. Use a value of zero (0) for columnNum to apply the colors to all columns within that break level.

plpForeColor — Name of the color in PrintList Pro's palette. This will be the foreground color for the break. If the name is not in PrintList Pro's palette or it is the empty string (""), then 4dForeColor will be used.

4dForeColor — 1 to 256. Foreground color number for the break (from 4D's palette). If a break foreground color has been previously set, it may be removed by setting plpForeColor to the empty string (""), and 4dForeColor to 1. The break foreground color may be left unchanged by setting plpForeColor to the empty string (""), and 4dForeColor to 0.

plpBackColor — Name of the color in PrintList Pro's palette. This will be the background color for the break. If the name is not in PrintList Pro's palette or it is the empty string (""), then 4dBackColor will be used.

4dBackColor — 1 to 256. Background color number for the break (from 4D's palette).
If a break background color has been previously set, it may be removed by setting plpBackColor to the empty string (""), and 4dBackColor to 1. The break background color may be left unchanged by setting plpBackColor to the empty string (""), and 4dBackColor to 0.

Examples:

```
`Set the foreground color for the break in column 3, break level 1, to red - no background color
PL_SetBrkColor(eList;1;3;"red";0;"";0)

`Set the background color for the break in column 3, break level 1, to blue - no foreground color
PL_SetBrkColor(eList;1;3;"";0;"Blue";0)
```

## PL_SetBrkRGBColor

(areaRef:L; breakLevel:I; columnNum:I; breakForeRed:L; breakForeGreen:L; breakForeBlue:L; breakBackRed:L; breakBackGreen:L; breakBackBlue:L)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → breakLevel | integer | Break level number |
| → columnNum | integer | Column number |
| → breakForeRed | longint | Foreground red |
| → breakForeGreen | longint | Foreground green |
| → breakForeBlue | longint | Foreground blue |
| → breakBackRed | longint | Background red |
| → breakBackGreen | longint | Background green |
| → breakBackBlue | longint | Background blue |

***PL_SetBrkRGBColor*** is used to specify the color of the text to be printed in the specified columnNum and breakLevel. This routine works in the same manner as PL_SetBrkColor, except it allows you to specify the colors using standard RGB values.

## PL_SetBkHColor

(areaRef:L; breakLevel:I; columnNum:I; plpForeColor:S; 4dForeColor:I; plpBackColor:S; 4dBackColor:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → breakLevel | integer | Break level number |
| → columnNum | integer | Column number |
| → plpForeColor | string | Foreground color from PrintList Pro's palette |
| → 4dForeColor | integer | Foreground color from 4D's palette |

| | | |
|---|---|---|
| → plpBackColor | string | Background color from PrintList Pro's palette |
| → 4dBackColor | integer | Background color from 4D's palette |

***PL_SetBkHColor*** is used to specify the color of the text to be printed in the break header for the specified columnNum and breakLevel.

PrintList Pro has its own palette, with the following colors: white, black, blue, green, yellow, magenta, red, cyan, gray, light gray.

breakLevel — This parameter specifies the break level to apply this command to.

columnNum — The column to apply this command to. Use a value of zero (0) for columnNum to apply the colors to all columns within that break level.

plpForeColor — Name of the color in PrintList Pro's palette. This will be the foreground color for the break. If the name is not in PrintList Pro's palette or it is the empty string (""), then 4dForeColor will be used.

4dForeColor — 1 to 256. Foreground color number for the break header (from 4D's palette). If a break header foreground color has been previously set, it may be removed by setting plpForeColor to the empty string (""), and 4dForeColor to 1. The break header foreground color may be left unchanged by setting plpForeColor to the empty string (""), and 4dForeColor to 0.

plpBackColor — Name of the color in PrintList Pro's palette. This will be the background color for the break header. If the name is not in PrintList Pro's palette or it is the empty string (""), then 4dBackColor will be used.

4dBackColor — 1 to 256. Background color number for the break header (from 4D's palette). If a break header background color has been previously set, it may be removed by setting plpBackColor to the empty string (""), and 4dBackColor to 1. The break header background color may be left unchanged by setting plpBackColor to the empty string (""), and 4dBackColor to 0.

Examples:

```
`Set the foreground color for the break header in column 3, break level 1, to red - no background color
PL_SetBkHColor(eList;1;3;"red";0;"";0)

`Set the background color for the break header in column 3, break level 1, to blue - no foreground color
PL_SetBrkColor(eList;1;3;"";0;"Blue";0)
```

## PL_SetBkHRGBColor

(areaRef:L; breakLevel:I; columnNum:I; brkHdrForeRed:L; brkHdrForeGreen:L; brkHdrForeBlue:L; brkHdrBackRed:L; brkHdrBackGreen:L; brkHdrBackBlue:L)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → breakLevel | integer | Break level number |

| | | |
|---|---|---|
| → columnNum | integer | Column number |
| → brkHdrForeRed | longint | Foreground red |
| → brkHdrForeGreen | longint | Foreground green |
| → brkHdrForeBlue | longint | Foreground blue |
| → brkHdrBackRed | longint | Background red |
| → brkHdrBackGreen | longint | Background green |
| → brkHdrBackBlue | longint | Background blue |

***PL_SetBkHRGBColor*** is used to specify the color of the text to be printed in the break header for the specified columnNum and breakLevel. This routine works in the same manner as PL_SetBkHColor, except it allows you to specify the colors using standard RGB values.

## PL_SetBrkHeight

(areaRef:L; breakLevel:I; numBreakLines:I; breakHeightPad:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → breakLevel | integer | Break level number |
| → numBreakLines | integer | Number of text lines in the break |
| → breakHeightPad | integer | Extra height for the break |

***PL_SetBrkHeight*** is used to set the number of lines of text along with additional height pad for breakLevel. If no calls to PL_SetBrkText are made for breakLevel, nothing will be displayed for any break occurring for that level regardless of the number of lines or height pad specified in ***PL_SetBkHeight***.

numBreakLines — The number of lines to give to each break of the specified break level. A value greater than 0 means that the height of each break is the same. The fixed height will be a function of the number of text lines specified. A value of zero means that the height of each break is to be calculated automatically based on the data that is to be printed. Default is 1.

breakHeightPad — The extra height to give to the break level. An additional padding may be set using breakHeightPad to allow more space around the break.Text will be centered vertically within the break. Default is 0.

***The padding applies to the entire break and not on a line by line basis within the break.***

Examples:

```
`Allocate 5 lines and no pad for break level 3
PL_SetBrkHeight(eList;3;5;0)

`Break level 2, Pad by 4 pixels, only 1 line
PL_SetBrkColor(eList;2;1;4)
```

## PL_SetBkHHeight

(areaRef:L; breakLevel:I; numBreakLines:I; breakHeightPad:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → breakLevel | integer | Break level number |
| → numBreakLines | integer | Number of text lines in the break |
| → breakHeightPad | integer | Extra height for the break |

***PL_SetBkHHeight*** is used to set the number of lines of text along with additional height pad for the specified break header level. The syntax of this command is identical to that of PL_SetBrkHeight.

numBreakLines — The number of lines to give to each break of the specified break level. A value greater than 0 means that the height of each break is the same. The fixed height will be a function of the number of text lines specified. A value of zero means that the height of each break is to be calculated automatically based on the data that is to be printed. Default is 1.

breakHeightPad — The extra height to give to the break level. An additional padding may be set using breakHeightPad to allow more space around the break.Text will be centered vertically within the break. Default is 0.

***The padding applies to the entire break and not on a line by line basis within the break.***

## PL_SetBrkRowDiv

(areaRef:L; lineWidth:F; pattern:S; plpColor:S; 4dColor:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → lineWidth | real | Width of the break/row divider line |
| → pattern | string | Pattern of the line |
| → plpColor | string | Color from PrintList Pro's palette for the line |
| → 4dColor | integer | Color from 4D's palette for the line |

***PL_SetBrkRowDiv*** is used to set the line width, pattern and color of the break/row divider line which is drawn between any/all break level information and the rows of list data (detail area) that immediately follow.

PrintList Pro has its own palette, with the following colors: white, black, blue, green, yellow, magenta, red, cyan, gray, light gray.

lineWidth — 0 to 1. This option controls the line width of the break/row divider line. A value of 0.25 pixels should be used for hairlines. A value of 0 means that no line will be printed.

pattern — Name of the pattern for the break/row divider line. If a null string is used then no line will be printed. These are the available patterns: white, black, gray, light gray, and dark gray.

plpColor — Name of the color in PrintList Pro's palette. This will be the color for the break/row divider line. If the name is not in PrintList Pro's palette or it is a null string, then 4dColor will be used.

4dColor — 1 to 256. The color at this position in 4D's palette will be used for the break/row divider line.

If ***PL_SetBrkRowDiv*** is not called, then the settings for the detail area row dividers, if any, will be used.

Examples:

```
`Print 1 pixel wide, solid Red break/row divider line
PL_SetBrkRowDiv(eList;1;"Black";"Red";0)

`Print hairline width, solid gray break/row divider line
PL_SetBrkRowDiv(eList;0.25;"Black";"Gray";0)
```

## PL_SetBrkColOpt

(areaRef:L; breakLevel:I; columnNum:I; showColDivider:I; lineWidth:F; pattern:S; plpColor:S; 4dColor:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → breakLevel | integer | Break level number |
| → columnNum | integer | Number of column |
| → showColDivider | integer | Show column divider, if any, in the break |
| → lineWidth | real | Width of the horizontal break line |
| → pattern | string | Pattern of the horizontal break line |
| → plpColor | string | Color from PrintList Pro's palette for the horizontal break line |
| → 4dColor | integer | Color from 4D's palette for the horizontal break line |

***PL_SetBrkColOpt*** is used to control the printing of column dividers and horizontal lines within the breakLevel for each columnNum and to print a horizontal line within a column for this break level.

If showColDivider is 1, a column divider will be printed along the right side of the column specified. The line characteristics are identical to the column divider shown in the list (detail area).

***PL_SetBrkColOpt*** may be called to show a horizontal line at the top of the break specified in breakLevel in the column specified by columnNum. This horizontal line could be used as a subtotal line to separate a column of values from a sum or average that is calculated in the break.

If ***PL_SetBrkColOpt*** is not called for any columns in a given break level, then no column dividers or horizontal break lines will be printed for that break level.

PrintList Pro has its own palette, with the following colors: white, black, blue, green, yellow, magenta, red, cyan, gray, light gray.

showColDivider — 0 or 1:

- **0** — don't show a column divider (default)
- **1** — show the column divider along the right side of the column specified in the columnNum parameter whenever a break for the break level specified in breakLevel occurs

lineWidth — 0 to 1. This option controls the line width of the horizontal break line. A value of 0.25 pixels should be used for hairlines. A value of 0 means that no line will be printed.

pattern — Name of the pattern for the horizontal break line. If a null string is used then no line will be printed. These are the available patterns: white, black, gray, light gray, and dark gray.

plpColor — Name of the color in PrintList Pro's palette. This will be the color for the horizontal break line. If the name is not in PrintList Pro's palette or it is a null string, then 4dColor will be used.

4dColor — 1 to 256. The color at this position in 4D's palette will be used for the horizontal break line.

Examples:

```
`Break level 2, column 3, print column divider and a hairline wide, solid Blue horizontal line in column
PL_SetBrkColOpt(eList;2;3;1;0.25;"Black";"Blue";0)

`Break level 4, print the column dividers in all columns, no horizontal break lines
PL_SetBrkColOpt(eList;4;0;1;0;"";"";0)
```

## PL_SetBkHColOpt

(areaRef:L; breakLevel:I; columnNum:I; showColDivider:I; lineWidth:F; pattern:S; plpColor:S; 4dColor:I)

| Parameter | Type | Description |
|---|---|---|
| → areaRef | longint | Reference of PrintList Pro object on layout |
| → breakLevel | integer | Break level number |
| → columnNum | integer | Number of column |
| → showColDivider | integer | Show column divider, if any, in the break |
| → lineWidth | real | Width of the horizontal break line |
| → pattern | string | Pattern of the horizontal break line |
| → plpColor | string | Color from PrintList Pro's palette for the horizontal break line |
| → 4dColor | integer | Color from 4D's palette for the horizontal break line |

***PL_SetBrkColOpt*** is used to control the printing of column dividers and horizontal lines within a break header cell. This command is identical to PL_SetBrkColOpt, except ***PL_SetBkHColOpt*** will print the horizontal lines at the bottom of the cell instead of at the top.

If showColDivider is 1, a column divider will be printed along the right side of the column specified. The line characteristics are identical to the column divider shown in the list (detail area).

***PL_SetBkHColOpt*** may be called to show a horizontal line at the bottom of the break specified in breakLevel in the column specified by columnNum.

If ***PL_SetBkHColOpt*** is not called for any columns in a given break level, then no column dividers or horizontal break lines will be shown for that break level.

PrintList Pro has its own palette, with the following colors: white, black, blue, green, yellow, magenta, red, cyan, gray, light gray.

showColDivider — 0 or 1:

- **0** — don't show a column divider (default)
- **1** — show the column divider along the right side of the column specified in the columnNum parameter whenever a break for the break level specified in breakLevel occurs

lineWidth — 0 to 1. This option controls the line width of the horizontal break line. A value of 0.25 pixels should be used for hairlines. A value of 0 means that no line will be printed.

pattern — Name of the pattern for the horizontal break line. If a null string is used then no line will be printed. These are the available patterns: white, black, gray, light gray, and dark gray.

plpColor — Name of the color in PrintList Pro's palette. This will be the color for the horizontal break line. If the name is not in PrintList Pro's palette or it is a null string, then 4dColor will be used.

4dColor — 1 to 256. The color at this position in 4D's palette will be used for the horizontal break line.

# Obsolete Commands

Several commands are obsolete in PrintList Pro's current version, but are still supported for compatibility. You should not use these commands for new projects.

This chapter provides a simple list for these commands and their syntax.

***PL_SetArrays*** (areaRef:L; columnNumber:I; numArrays:I; array1:X; …; arrayN:X) → resultCode:L)

***PL_SaveData*** (areaRef:L; savePict:P) → resultCode:L

***PL_RestoreData*** (areaRef:L; restorePict:P) → resultCode:L

# Examples

The examples in this section are designed to provide an overview of the use of PrintList Pro and the basic commands.

You may also wish to examine the non-compiled version of the PrintList Pro demo, for more examples on the various PrintList Pro capabilities.

## Example 1 — One record current selection

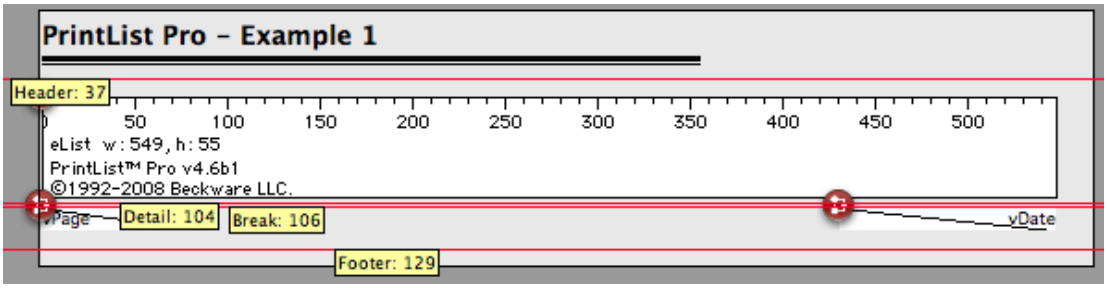
Print a list of information (First name, Last name, Salary, City, State, Zip, Country) contained in a series of seven arrays. Show column headers and print dividing lines between the columns. Do not print dividing lines between the rows.

**PRINT SELECTION** is used to print PrintList Pro plug-in objects. It is important therefore, that you carefully control the current selection, since a PrintList Pro plug-in object will print once for each record in the current selection.

This example illustrates a situation where the PrintList Pro object is to be printed once, so we can use the **PRINT RECORD** command regardless of the current selection.

First we need to create the layout and draw the PrintList Pro plug-in object. We'll name the object **eList**.

Our layout now looks something like this:




The project method which controls the printing is:

```
ALL RECORDS([Layouts])
OUTPUT FORM([Layouts];"Example 1")
PRINT RECORD([Layouts])
```

## Examples

We'll use the On Printing Detail event to configure our PrintList Pro area. Here is the PrintList Pro area's object method:

```
If (Form event=On Printing Detail)
  ALL RECORDS ([People])
  `Create the arrays from the data
  SELECTION TO ARRAY ([People]First Name;aFname;[People]Last Name;aLname;[People]Salary;
    aSalary;[People]City;aCity;[People]State;aState;[People]Zip;aZip;[People]Country;aCountry)
  $plErr:=PL_SetArraysNam (eList;1;7;"aFname";"aLname";"aSalary";"aCity";"aState";"aZip";
    "aCountry") `set the arrays
  If ($plErr=0)
    PL_SetHdrOpts (eList;2;0) `print headers on all pages
    PL_SetHeaders (eList;1;7;"First Name";"Last Name";"Salary";"City";"State";"Zip";"Country")
    PL_SetHdrStyle (eList;0;"Lucida Grande";10;1) `apply to all headers: Lucida Grande 10 point bold
    PL_SetStyle (eList;0;"Lucida Grande";9;0) `apply to all columns: Lucida Grande 9 point plain
    PL_SetDividers (eList;25;"Black";"Gray";0;0;"";"";0) `print only column dividers: solid gray hairlines
    PL_SetSort (eList;-2) `sort column 2 (Last name) in descending order
  End if
End if
```

The printed layout will appear as shown below:

**PrintList Pro – Example 1**

| First Name | Last Name | Salary | City | State | Zip | Country |
|---|---|---|---|---|---|---|
| Todd | Zipnick | 52,230.08 | Phoenix | AZ | 60090 | USA |
| Bob | Yuderman | 22,295.00 | Paris | | 94538 | France |
| Jeffrey | Young | 49,687.96 | Los Angeles | CA | 94404 | USA |
| Del | Yocam | 63,118.86 | San Jose | CA | 95014 | USA |
| Curtis | Wright | 84,651.42 | Rome | | 95113 | Italy |
| William | Woodward | 26,602.10 | Bangkok | | 94107 | Thailand |
| Ron | Wong | 24,500.00 | San Jose | CA | 95014 | USA |
| Ron | Wolf | 25,432.96 | Minneapolis | MN | 95190 | USA |
| Amy | Wohl | 62,771.94 | London | | 19004 | England |
| Robert | Wiggins | 75,296.34 | Jersulaem | | 94306 | Israel |
| Clair | Whitmer | 27,975.08 | Tapei | Ta | 94105 | ROC |
| Joel | Weiss | 86,803.50 | Redmond | WA | 94544 | USA |
| Peter | Watkins | 92,377.74 | Portland | OR | 95014 | USA |
| John | Warnock | 95,805.78 | Milan | | 94039-7900 | Italy |
| George | Voltz | 60,843.30 | San Jose | CA | 02144 | USA |
| Steve | Vollum | 63,119.84 | Munich | | 97005 | Germany |
| Larry | Tesler | 39,933.04 | Santa Fe | NM | 95014 | USA |
| Michael | Tchong | 24,963.54 | Cupertino | CA | 94105 | USA |
| Jeffrey | Tarter | 65,115.12 | Denver | CO | 02138 | USA |
| Harry | Sweere | 60,111.24 | Boston | MA | 55121 | USA |
| Karen | Sullivan | 61,707.66 | Portland | OR | 10018 | USA |
| Michael | Stern | 28,716.94 | Brooklyn | NY | 19131 | USA |
| Mitch | Stein | 26,078.78 | Portland | OR | 94039-7900 | USA |
| Sherwin | Steffin | 70,962.78 | Cupertino | CA | 91302 | USA |
| Martha | Steffen | 50,354.36 | Tapei | Ta | 95014 | ROC |
| Steven | Stansel | 24,130.54 | San Jose | CA | 01867 | USA |
| David | Smith | 23,551.36 | Los Angeles | CA | 92670 | USA |
| Doug | Sleeter | 65,797.20 | Santa Fe | NM | 95014 | USA |
| Mike | Slade | 47,057.64 | Boston | MA | 98072 | USA |
| Pradeep | Singh | 49,758.52 | Munich | | 98072 | Germany |
| Rich | Shapero | 61,049.10 | Tapei | Ta | 94501 | ROC |
| Richard | Shaffer | 26,659.92 | Quincy | MA | 10016 | USA |
| Dan | Shafer | 21,181.72 | Ft. Worth | TX | 94062 | USA |
| Jonathan | Seybold | 22,741.88 | Dallas | TX | 90265 | USA |

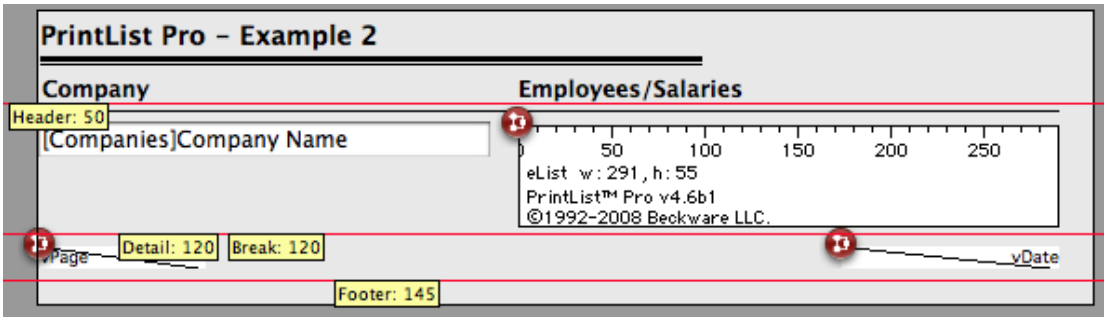
# Example 2 — Multiple record current selection

Print a list of company names, showing all the people who work for each company. This example will illustrate the use of PrintList Pro with multiple records in the current selection.

For purposes of illustration, the company names will be printed directly from the [Companies] table, and the [People] information will be printed from a series of arrays using PrintList Pro.

Create the layout and draw the PrintList Pro plug-in object. This process is substantially the same as that explained in the first example, with one exception — we are going to include a field directly on the layout which will print information alongside the PrintList Pro object.

Our layout is illustrated below:




The only difference between this example and Example 1 is that we are printing out multiple records. Since the PrintList Pro commands are executed in the On Printing Detail event of the **PRINT SELECTION** command we can change the People arrays "on the fly".

The [Companies] file is in a One-to-Many relationship with the [People] file, and the links are automatic. As each [Companies] record is printed a new selection of [People] records is created. This [People] selection is stored in arrays and printed.

The controlling project method is:

```
ALL RECORDS([Companies])
OUTPUT FORM([Companies];"Example 2")
PRINT SELECTION([Companies])
```

## Examples

The PrintList Pro area's object method is:

```
If (Form event=On Printing Detail)
  `Create the arrays . The current selection of [People] changes with each new record
  SELECTION TO ARRAY ([People]First Name;aFname;[People]Last Name;aLname;[People]Salary;
    aSalary)
  $plErr:=PL_SetArraysNam (eList;1;3;"aFname";"aLname";"aSalary") `set the arrays
  If ($plErr=0)
    PL_SetHdrOpts (eList;1;0) `print headers at the top of the area only
    PL_SetHeaders (eList;1;3;"First Name";"Last Name";"Salary") `set headers
    PL_SetHdrStyle (eList;0;"Lucida Grande";10;1) `apply to all headers: Lucida Grande 10 point bold
    PL_SetStyle (eList;0;"Lucida Grande";9;0) `apply to all columns: Lucida Grande 9 point plain
    PL_SetFormat (eList;3;"$###,###,###.00";3;3) `format column 3, right justified header and column
    PL_SetFrame (eList;0.25;"Black";"Black";0;0.25;"Black";"Black";0) `solid black hairline frame/hdr line
  End if
End if
```

A portion of our resulting printout appears below:

**PrintList Pro – Example 2**

| Company | Employees/Salaries | | |
|---|---|---|---|
| Addison-Wesley Publishing Co., | **First Name** | **Last Name** | **Salary** |
| | Mike | Erickson | $1,000.00 |
| | Steven | Stansel | $24,130.54 |
| Apple Computer, Inc. | **First Name** | **Last Name** | **Salary** |
| | Barbara | Anderson | $68,484.36 |
| | Samir | Arora | $63,847.98 |
| | Randy | Battat | $26,898.06 |
| | Bill | Coldrick | $42,369.32 |
| | Debi | Coleman | $71,092.14 |
| | Moira | Cullen | $69,613.32 |
| | David | Eyes | $28,964.88 |
| | Jonathan | Fader | $30,048.76 |
| | Jim | Floyd | $25,055.66 |
| | Linda | Glish | $63,990.08 |
| | Russ | Havard | $20,953.38 |
| | Mike | Homer | $46,056.08 |
| | Barbara | Krause | $41,832.28 |
| | Tim | Kreps | $80,500.14 |
| | Jon | Magill | $59,917.20 |
| | John | Sculley | $25,392.78 |
| | Doug | Sleeter | $65,797.20 |
| | Martha | Steffen | $50,354.36 |
| | Larry | Tesler | $39,933.04 |
| | Peter | Watkins | $92,377.74 |
| | Ron | Wong | $24,500.00 |
| National Apple Professional In | **First Name** | **Last Name** | **Salary** |
| | Mike | Bailey | $83,410.74 |
| CompuServe | **First Name** | **Last Name** | **Salary** |
| | Sharon | Jones | $90,019.86 |
| Affinity Microsystems, Ltd. | **First Name** | **Last Name** | **Salary** |
| | Rick | Barron | $59,908.38 |

# Example 3 — Adding a total line to the list

Print the same list of company names and people as Example 2 and add a total line after the end of each list of people. The total line will contain a sum of the salaries for all the people working for that company.

A total line requires us to use PrintList Pro's Break Level commands.

While most break levels require the list to be sorted, a total line is the exception. The total line is is configured by passing 0 for the break level parameter.

The object method for the PrintList Pro area in Example 2 has been modified to include the Break Level calls needed as shown below:

```
If (Form event=On Printing Detail)
  `Create the arrays . The current selection of [People] changes with each new record
  SELECTION TO ARRAY ([People]First Name;aFname;[People]Last Name;aLname;[People]Salary;
    aSalary)
  $plErr:=PL_SetArraysNam (eList;1;3;"aFname";"aLname";"aSalary") `set the arrays
  If ($plErr=0)
    PL_SetHdrOpts (eList;1;0) `print headers at the top of the area only
    PL_SetHeaders (eList;1;3;"First Name";"Last Name";"Salary") `set headers
    PL_SetHdrStyle (eList;0;"Lucida Grande";10;1) `apply to all headers: Lucida Grande 10 point bold
    PL_SetStyle (eList;0;"Lucida Grande";9;0) `apply to all columns: Lucida Grande 9 point plain
    PL_SetFormat (eList;3;"$###,###,###.00";3;3) `format column 3, right justified header and column
    PL_SetFrame (eList;0.25;"Black";"Black";0;0.25;"Black";"Black";0) `solid black hairline frame/hdr line
    PL_SetWidths (eList;1;3;80;80;100) `set the column widths
    `Configure the total line
    PL_SetBrkText (eList;0;3;"\Sum";0;0) `calculate the sum in the total line
    PL_SetBrkHeight (eList;0;1;4) `add some padding to the total line
    PL_SetBrkColOpt (eList;0;3;0;0.25;"Black";"Black";0) `draw a line above the total
  End if
End if
```

The total line now appears in the list as is shown below:

## PrintList Pro - Example 3

**Company** — **Employees/Salaries**

Addison-Wesley Publishing Co.,

| First Name | Last Name | Salary |
|---|---|---|
| Mike | Erickson | $1,000.00 |
| Steven | Stansel | $24,130.54 |
| | | $25,130.54 |

Apple Computer, Inc.

| First Name | Last Name | Salary |
|---|---|---|
| Barbara | Anderson | $68,484.36 |
| Samir | Arora | $63,847.98 |
| Randy | Battat | $26,898.06 |
| Bill | Coldrick | $42,369.32 |
| Debi | Coleman | $71,092.14 |
| Moira | Cullen | $69,613.32 |
| David | Eyes | $28,964.88 |
| Jonathan | Fader | $30,048.76 |
| Jim | Floyd | $25,055.66 |
| Linda | Glish | $63,990.08 |
| Russ | Havard | $20,953.38 |
| Mike | Homer | $46,056.08 |
| Barbara | Krause | $41,832.28 |
| Tim | Kreps | $80,500.14 |
| Jon | Magill | $59,917.20 |
| John | Sculley | $25,392.78 |
| Doug | Sleeter | $65,797.20 |
| Martha | Steffen | $50,354.36 |
| Larry | Tesler | $39,933.04 |
| Peter | Watkins | $92,377.74 |
| Ron | Wong | $24,500.00 |
| | | $1,037,978.76 |

National Apple Professional In

| First Name | Last Name | Salary |
|---|---|---|
| Mike | Bailey | $83,410.74 |
| | | $83,410.74 |

CompuServe

| First Name | Last Name | Salary |
|---|---|---|
| Sharon | Jones | $90,019.86 |
| | | $90,019.86 |

Affinity Microsystems, Ltd.

| First Name | Last Name | Salary |
|---|---|---|
| Rick | Barron | $59,908.38 |
| | | $59,908.38 |

San Jose Mercury News

| First Name | Last Name | Salary |
|---|---|---|
| Jim | Bartimo | $21,418.88 |
| Rory | O'Connor | $63,409.92 |
| Ron | Wolf | $25,432.96 |
| | | $110,261.76 |

Think Educational Software, In

| First Name | Last Name | Salary |
|---|---|---|
| Gregory | Berkin | $62,239.80 |
| | | $62,239.80 |

# Example 4 — Break Level Processing

Print the same list of information shown in Example 1 and add some break level information for all the people in the same city. The break will show a sum, average, minimum, maximum and standard deviation of the people's salaries in each city.

Labels for each of the calculations will be printed in the adjacent column to salary. The break will also show the number of people in the city and the city name.

The list is sorted by country, state, city and last name. This allows the suppression of repeated values for each of these columns. In order to set break information for the city, we must configure break level 3 because the city array is 3rd in the sort order.

Each of the calculations mentioned will be printed on a separate line, so the height of the break is set to 5 lines. Carriage returns are inserted between the labels and calculations so that each will start on a new line.

A custom calculation to perform the standard deviation is included along with the other calculations.

The code for the callback function follows the object method to the PrintList Pro object. In addition, two header lines are shown to demonstrate the ability for multiple lines in a header.

The object method for the PrintList Pro plug-in area in Example 1 has been modified to include the Break Level calls needed as shown below:

```
If (Form event=On Printing Detail)
  ALL RECORDS ([People])
  `Create the arrays from the data
  SELECTION TO ARRAY ([People]First Name;aFname;[People]Last Name;aLname;[People]Salary;
    aSalary;[People]City;aCity;[People]State;aState;[People]Zip;aZip;[People]Country;aCountry)
  $plErr:=PL_SetArraysNam (eList;1;7;"aFname";"aLname";"aSalary";"aCity";"aState";"aZip";
    "aCountry") `set the arrays
  If ($plErr=0)
    PL_SetHdrOpts (eList;2;0) `print headers on all pages
    PL_SetHeight (eList;2;4;1;0) `2 hdr lines, 4 hdr pad, 1 row line, 2 row pad
    PL_SetHeaders (eList;1;7;"First Name";"Last Name";"Salary";"City";"State";"Zip";"Country")
    PL_SetHdrStyle (eList;0;"Lucida Grande";10;1) `apply to all headers: Lucida Grande 10 point bold
    PL_SetStyle (eList;0;"Lucida Grande";9;0) `apply to all columns: Lucida Grande 9 point plain
    PL_SetFormat (eList;3;"$###,###,###.00";3;3) `format column 3, right justified header and column
    PL_SetFrame (eList;0.25;"Black";"Black";0;0.25;"Black";"Black";0) `print solid black hairline frame
    PL_SetWidths (eList;1;7;76;80;89;79;45;80;48) `set the column widths
    PL_SetBackClr (eList;"Light Gray";0;"White";0)
    PL_SetSort (eList;-7;5;4;-2) `sort by Country (descending), State, City, and Last Name (descending)
    `Break level Configuration
    PL_SetRepeatVal (eList;0;1) `suppress repeating values in all columns
    PL_SetBrkFunc (eList;"Break Function") `set the callback function
```

```
   PL_SetBrkRowDiv(eList;0.25;"Black";"Black";0) `print a Break/Row divider
   ` Configure break level 3, city
   PL_SetBrkHeight(eList;3;5;4) `print 5 lines for break level 3
   `Print the calculation labels in the column to the left of the salaries
   PL_SetBrkText(eList;3;2;"Sum"+Char(13)+"Average"+Char(13)+"Minimum"+Char(13)
     +"Maximum"+Char(13)+"Standard Dev";0;3)
   PL_SetBrkStyle(eList;3;2;"Lucida Grande";9;1) `make the labels bold
   `Print the Sum, Average, Minimum, Maximum, and Standard Deviation for salaries
   PL_SetBrkText(eList;3;3;"\Sum"+Char(13)+"\Average"+Char(13)+"\Minimum"+Char(13)
     +"\Maximum"+Char(13)+"\Function";0;0)
     `Show the number of people in this city
   PL_SetBrkText(eList;3;5;Char(13)+"\Count people in \breakValue";1;2)
   PL_SetBrkStyle(eList;3;5;"Lucida Grande";9;3) `make the city count info bold
   PL_SetBrkColOpt(eList;3;3;0;0.25;"Black";"Black";0) `print a subtotal line in the salary column
  End if
End if
```

The *Break Function* callback method for the custom calculation is as follows:

```
C_INTEGER ($1;$2) `break level, column
C_STRING (82;$3) `column format
C_LONGINT($4;$5) `start row, end row
C_TEXT($0) `custom calculation result to print
C_REAL($result;$average)
`Calculate the average
$result:=0
For($i;$4;$5)
  $result:=$result+aSalary{$i}
End for
$count:=$5-$4+1
$average:=$result/$count
`Calculate the standard deviation
$result:=0
For($i;$4;$5)
  $result:=$result+(($average-aSalary{$i})^2) `square the difference
End for
$result:=$result/$count
$result:=Square root($result) `take the square root of the variance
$0:=String($result;$3)
```

Here is a sample of the list containing the breaks:

## PrintList Pro – Example 4

| First Name | Last Name | Salary | City | State | Zip | Country |
|---|---|---|---|---|---|---|
| Bill | Goodhew | $23,275.98 | Podunk | AR | 30093 | USA |
| Stan | Getz | $60,956.00 | | | | |
| Yogen | Dalal | $41,491.24 | | | 95052-8168 | |
| Bill | Coldrick | $42,369.32 | | | 95110 | |
| | **Sum** | $168,092.54 | | | | |
| | **Average** | $42,023.13 | ***4 people in Podunk*** | | | |
| | **Minimum** | $23,275.98 | | | | |
| | **Maximum** | $60,956.00 | | | | |
| | **Standard Dev** | $13,325.83 | | | | |
| Todd | Zipnick | $52,230.08 | Phoenix | AZ | 60090 | USA |
| Michelle | Preston | $31,782.38 | | | 10004 | |
| John | Markoff | $20,416.34 | | | 10036 | |
| | **Sum** | $104,428.80 | | | | |
| | **Average** | $34,809.60 | ***3 people in Phoenix*** | | | |
| | **Minimum** | $20,416.34 | | | | |
| | **Maximum** | $52,230.08 | | | | |
| | **Standard Dev** | $13,163.11 | | | | |
| Michael | Tchong | $24,963.54 | Cupertino | CA | 94105 | USA |
| Sherwin | Steffin | $70,962.78 | | | 91302 | |
| Jonathan | Fader | $30,048.76 | | | 95014 | |
| Mary | Evslin | $46,685.24 | | | 05602 | |
| Moira | Cullen | $69,613.32 | | | 95014 | |
| Ed | Cheffetz | $53,588.36 | | | 33634 | |
| | **Sum** | $295,862.00 | | | | |
| | **Average** | $49,310.33 | ***6 people in Cupertino*** | | | |
| | **Minimum** | $24,963.54 | | | | |
| | **Maximum** | $70,962.78 | | | | |
| | **Standard Dev** | $17,654.11 | | | | |
| Jeffrey | Young | $49,687.96 | Los Angeles | CA | 94404 | USA |
| David | Smith | $23,551.36 | | | 92670 | |
| Scott | Schwarts | $24,334.38 | | | 85203 | |
| Stephen | Saltzman | $62,937.56 | | | 97207 | |
| Bill | Gates | $26,287.52 | | | 98072 | |
| Bruce | Davis | $57,186.92 | | | 94025 | |
| Raines | Cohen | $29,784.16 | | | 94709 | |
| Paul | Brainerd | $59,952.48 | | | 98104 | |
| Lofty | Becker | $85,627.50 | | | 06105 | |
| | **Sum** | $419,349.84 | | | | |
| | **Average** | $46,594.42 | ***9 people in Los Angeles*** | | | |
| | **Minimum** | $23,551.36 | | | | |
| | **Maximum** | $85,627.50 | | | | |
| | **Standard Dev** | $20,581.37 | | | | |
| Christopher | Robert | $51,063.88 | San Francisco | CA | 02090 | USA |
| Regis | McKenna | $57,916.04 | | | 94303 | |
| Bob | Leff | $87,341.52 | | | 90312 | |
| Mike | Kramer | $21,337.54 | | | 77098 | |
| Ed | Bogas | $51,108.96 | | | 94583 | |
| | **Sum** | $268,767.94 | | | | |
| | **Average** | $53,753.58 | ***5 people in San Francisco*** | | | |
| | **Minimum** | $21,337.54 | | | | |
| | **Maximum** | $87,341.52 | | | | |
| | **Standard Dev** | $21,026.19 | | | | |
| Del | Yocam | $63,118.86 | San Jose | CA | 95014 | USA |
| Ron | Wong | $24,500.00 | | | 95014 | |
| George | Voltz | $60,843.30 | | | 02144 | |

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# PrintList Pro Command Reference Alphabetical

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**PL_SetHeaders** (areaRef:L; columnNumber:I; numHeaders:I; header1:S; …; headerN:S) ....31

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**PL_SetRGBFrame** (areaRef:L; frameLineWidth:F; frameLinePattern:S; frameLineRed:L; frameLineGreen:L; frameLineBlue:L; headerLineWidth:F; headerLinePattern:S; headerLineRed:L; headerLineGreen:L; headerLineBlue:L;)....54

**PL_SetRowColor** (areaRef:L; rowNumber:L; plpRowForeColor:S; 4dRowForeColor:L; plpRowBackColor:S; 4dRowBackColor:L)....48

**PL_SetRowRGBColor** (areaRef:L; rowNumber:L; rowForeRed:L; rowForeGreen:L; rowForeBlue:L; rowBackRed:L; rowBackGreen:L; rowBackBlue:L) ....50

**PL_SetRowStyle** (areaRef:L; rowNumber:L; styleNum:I; fontName:S; fontSize:I) ....47

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# PrintList Pro Constant List

## PLP Colors

| Constant | Type | Value |
|---|---|---|
| PL White | S | white |
| PL Black | S | black |
| PL Magenta | S | magenta |
| PL Red | S | red |
| PL Cyan | S | cyan |
| PL Green | S | green |
| PL Blue | S | blue |
| PL Yellow | S | yellow |
| PL Gray | S | gray |
| PL Light gray | S | light gray |
| PL Use 4D palette color | S | |

## PLP Patterns

| | | |
|---|---|---|
| PL White pattern | S | white |
| PL Black pattern | S | black |
| PL Gray pattern | S | gray |
| PL Light gray pattern | S | light gray |
| PL Dark gray pattern | S | dark gray |

## PLP Command Results

| | | |
|---|---|---|
| PL Registration Failed | L | 0 |
| PL Registration Passed | L | 1 |
| PL SetArrays Passed | L | 0 |
| PL Not an array | L | 1 |
| PL Wrong type of array | L | 2 |
| PL Wrong number of rows | L | 3 |
| PL Maximum number of arrays exc | L | 4 |
| PL Not enough memory | L | 5 |

| | | |
|---|---|---|
| PL SetFile Passed | L | 0 |
| PL Not a file | L | 6 |
| PL Wrong 4D version | L | 10 |
| PL Arrays have been set | L | 11 |
| PL Fields have been set | L | 12 |
| PL SetFields Passed | L | 0 |
| PL Not a field | L | 7 |
| PL Wrong field type | L | 8 |
| PL Maximum fields exceeded | L | 9 |
| PL Save Data Passed | L | 0 |
| PL Save Data Failed | L | 1 |
| PL Restore Data Passed | L | 0 |
| PL Restore Data Failed | L | 1 |

# PLP Justification

| | | |
|---|---|---|
| PL Just Default | L | 0 |
| PL Just Left | L | 1 |
| PL Just Center | L | 2 |
| PL Just Right | L | 3 |

# PLP Font Style

| | | |
|---|---|---|
| PL Plain | L | 0 |
| PL Bold | L | 1 |
| PL Italic | L | 2 |
| PL Underline | L | 4 |
| PL Outline | L | 8 |
| PL Shadow | L | 16 |
| PL Condensed | L | 32 |
| PL Extended | L | 64 |

# PLP Break Levels

| | | |
|---|---|---|
| PL Break Level 1 | L | 1 |
| PL Break Level 2 | L | 2 |
| PL Break Level 3 | L | 3 |
| PL Break Level 4 | L | 4 |
| PL Break Level 5 | L | 5 |
| PL Break Level 6 | L | 6 |
| PL Break Level 7 | L | 7 |
| PL Break Level 8 | L | 8 |
| PL Break Level 9 | L | 9 |
| PL Sum | S | \Sum |
| PL Average | S | \Average |
| PL Minimum | S | \Minimum |
| PL Maximum | S | \Maximum |
| PL Count | S | \Count |
| PL Break Value Insertion | S | \BreakValue |
| PL Custom Calculation | S | \Function |

# PLP Options

| | | |
|---|---|---|
| PL No Headers | L | 0 |
| PL First Page Header | L | 1 |
| PL Print All Headers | L | 2 |
| PL Suppress Pixel Width | L | 0 |
| PL Print Pixel Width | L | 1 |
| PL Print Array | L | 0 |
| PL Hide Array | L | 1 |
| PL Print All Records | L | -1 |
| PL Print Page Breaks | L | 1 |
| PL Suppress Page Breaks | L | 0 |
| PL Print Last Page Break | L | 1 |
| PL Suppress Last Page Break | L | 0 |
| PL Print Repeated Values | L | 0 |
| PL Suppress Repeated Values | L | 1 |
| PL Print Column Divider | L | 0 |
| PL Suppress Column Divider | L | 1 |
| PL Suppress Detail Area | L | 1 |